VBA11001-R.3663.B

作成承認印	配布許可印
ニコン 映像カンパニー 品質保証部 GM	サービス 計画課 M

D70s VBA11001

REPAIR MANUAL(REVISED-1)

Nikon | NIKON CORPORATION
Tokyo, Japan

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Specifications

Type	Single-lens reflex digital camera with interchangeable lenses
Effective pixels	6.1 million
CCD	23.7 × 15.6 mm; total pixels: 6.24 million
Image size (pixels)	• 3008 × 2000 (Large) • 2240 × 1488 (Medium) • 1504 × 1000 (Small)
Lens mount	Nikon F mount (with AF coupling and AF contacts)
Compatible lenses*	
Type G or D AF Nikkor	All functions supported
Micro Nikkor 85 mm f/2.8D	All functions supported except autofocus and some exposure modes
Other AF Nikkor†	All functions supported except 3D color matrix metering and i-TTL Balanced Fill-Flash for Digital SLR
AI-P Nikkor	All functions supported except 3D color matrix metering, i-TTL Balanced Fill-Flash for Digital SLR, and autofocus
Non-CPU	Can be used in mode **M**, but exposure meter does not function; electronic range fi nder can be used if maximum aperture is f/5.6 or faster
* IX Nikkor lenses can not be used	† Excluding lenses for F3AF
Picture angle	Equivalent in 35-mm format is approximately 1.5 times lens focal length
Viewfinder	Fixed-eyelevel penta-Dach-mirror type
Diopter adjustment	–1.6 – +0.5 m^{-1}
Eyepoint	18 mm (–1.0 m^{-1})
Focusing screen	Type B BriteView clear matte screen Mark V with superimposed focus brackets and On-Demand grid lines
Frame coverage	Approximately 95% of lens (vertical and horizontal)
Magnification	Approximately 0.75× (50-mm lens at infinity; –1.0 m^{-1}
Reflex mirror	Quick return
Lens aperture	Instant return with depth-of-field preview
Focus-area selection	Can be selected from 5 focus areas
Lens servo	• Autofocus (AF): Instant single-servo AF(AF-S);continuous-servo AF (AF-C); predictive focus tracking automatically activated according to subject status • Manual focus (M)

Autofocus	TTL phase detection by Nikon Multi-CAM900 autofocus module with AF-assist illuminator (range approximately 0.5–3.0 m / 1′8″ – 9′10″)
Detection range	–1 – +19 EV (ISO 100 at 20 °C/68 °F)
AF-area mode	Single-area AF, dynamic-area AF, dynamic-area AF with closest subject priority
Focus lock	Focus can be locked by pressing shutter-release button halfway (single-servo AF) or by pressing AE-L/AF-L button
Exposure	
Metering	Three-mode through-the-lens (TTL) exposure metering
Matrix	3D color matrix metering (type G and D lenses); color matrix metering (other CPU lenses); metering performed by 1,005-pixel RGB sensor
Center-weighted	Weight of 75% given to 6, 8, 10, or 12-mm circle in center of frame
Spot	Meters 2.3-mm circle (about 1% of frame) centered on active focus area
Range (ISO 100 equivalent, f/1.4 lens, 20 °C/68 °F)	0 – 20 EV (3D color matrix or center-weighted metering) 2 – 20 EV (spot metering)
Exposure meter coupling	CPU coupling
Exposure control	
Operating mode	Digital Vari-Program (auto, portrait, landscape, close up, sports, night landscape, night portrait), programmed auto (P) with flexible program; shutter-priority auto (S); aperture priority auto (A); manual (M)
Exposure compensation	–5 – +5 EV in increments of 1/3 or ½ EV
Bracketing	Exposure and / or flash bracketing (2–3 exposures in increments of 1/3 or ½ EV)
Exposure lock	Luminosity locked at detected value with AE-L/AF-L button
Shutter	Combined mechanical and CCD electronic shutter
Speed	30 – 1/8000 s in steps of 1/3 or ½ EV, bulb, remote
Sensitivity	200 – 1600 (ISO equivalent) in steps of 1/3 EV
White balance	Auto (TTL white-balance with 1,005 pixels RGB sensor), six manual modes with fine-tuning, preset white balance
Bracketing	2–3 exposures in increments of 1

Built-in Speedlight	• 、、、:auto flash with auto pop-up • P, S, A, M : manual pop-up with button release
Guide number (m / ft at 20 °C/68 °F)	• ISO 200: approximately 15/49 (manual 17/56) • ISO 100: approximately 11/36 (manual 12/39)
Flash	
Sync contact	X-contact only; flash synchronization at up to 1/500 s
Flash control	
TTL	TTL flash control by 1,005-pixel RGB sensor (CPU lenses only) • Built-in Speedlight: i-TTL balanced fill-flash for digital SLR, or standard i-TTL flash for digital SLR (spot metering or mode dial set to M) • SB-800 or 600: i-TTL balanced fill-flash for digital SLR, or standard i-TTL flash for digital SLR (spot metering)
Auto aperture	Available with SB-800 with CPU lens
Non-TTL auto	Available with such Speedlights as SB-800, 80DX, 28DX, 28, 27, and 22s
Range-priority manual	Available with SB-800
Sync modes	• 、、: front curtain sync, red-eye reduction • : slow sync, slow sync with red-eye reduction • 、、: front curtain sync and red-eyereduction available with optional Speedlights • P, S, A, M: front curtain sync, slow sync, rear-curtain sync, red-eye reduction, slow sync with red-eye reduction
Flash compensation	–3 – +1 EV in increments of 1/3 or ½ EV
Flash-ready indicator	Lights when SB-series Speedlight such as 800, 600, 80DX, 28DX, 50DX, 28, 27, or 22s is fully charged; blinks for 3s after flash is fired at full output
Accessory shoe	Standard ISO hot-shoe contact with safety lock
Creative Lighting System	Supports Flash Color Information Communication and FV lock with built-in Speedlight, SB-800, and SB-600. SB-800 and 600 also support Advanced Wireless Lighting.
Storage	
Media	Type I and II Compact Flash memory cards; Microdrives
File system	Compliant with Design Rule for Camera File System (DCF) 2.0 and Digital Print Order Format (DPOF)
Compression	• NEF (RAW): compressed 12-bit • JPEG: JPEG baseline-compliant

Self-timer	Electronically controlled timer with 2 – 20 s duration
Depth-of-fi eld preview	When CPU lens is attached, lens aperture can be stopped down to value selected by user (**A** and **M** modes) or value selected by camera (Digital Vari-Program, **P**, and **S** modes)
Monitor	2.0″, 130,000-dot, low-temperature polysilicon TFT LCD with brightness adjustment
Video output	Can be selected from NTSC and PAL
External interface	USB 2.0 full speed
Tripod socke	t ¼″ (ISO)
Firmware upgrades	Firmware can be upgraded by user
Supported languages	Chinese (Simplified), Dutch, English, French, German, Italian, Japanese, Korean, Spanish, Swedish
Power source	• One rechargeable Nikon EN-EL3a or EN-EL3 Li-ion battery; charging voltage (MH-18a quick charger or optional MH-18 quick charger or MH-19 multi charger): 7.4 V DC • Three CR2 lithium batteries (with optional MS-D70 battery holder) • EH-5 AC adapter (available separately)
Dimensions	(W × H × D) Approximately 140 × 111 × 78 mm (5.5″ × 4.4″ × 3.1″)
Weight	Approximately 600 g (1 lb 5 oz) without battery, memory card, body cap, or monitor cover
Operating environment	
Temperature	0 – 40 °C (32 – 104 °F)
Humidity	Less than 85% (no condensation)

• Unless otherwise stated, all figures are for a camera with a fully-charged battery operating at an ambient temperature of 20 °C (68 °F).

• Nikon reserves the right to change the specifications of the hardware and software described this manual at any time and without prior notice. Nikon will not be held liable for damages that may result from any mistakes that this manual may contain.

Disassembly

⚠ WARNING	
	● Due to an internal high voltage area, take extra care not to get an electric shock when detaching covers. ● After removing covers, be sure to discharge the main condenser according to the instructions of the repair manuals.

Note : ① When disassembling/(re)assembling, be sure to use the conductive mat (J5033) and wrist strap (J5033-5) for static protection of electrical parts.

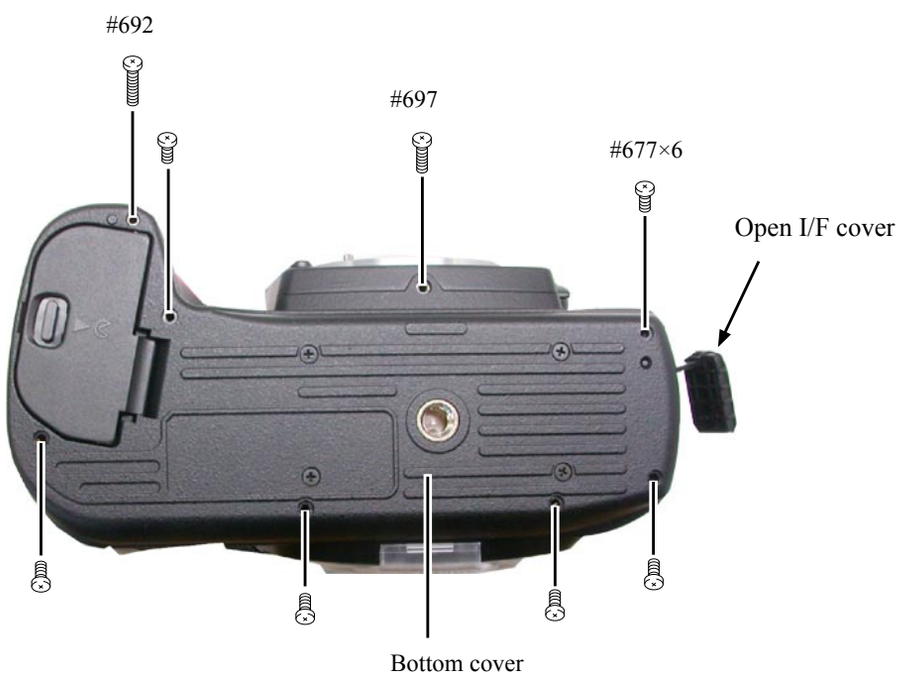
② Before disassembling, be sure to remove batteries or AC power wires.

③ When disassembling, make sure to memorize the processing state of wires and FPC, screws to be fixed and their types, etc.

④ Because the low pass filter of the imaging CCD PCB is easily damaged, handle it with enough care.

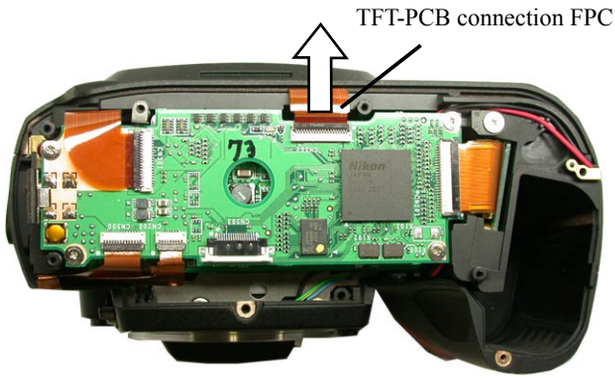
1. Separate Front and Rear bodies

Bottom Cover



Rear cover

・Remove the TFT-PCB connection FPC from the connector.



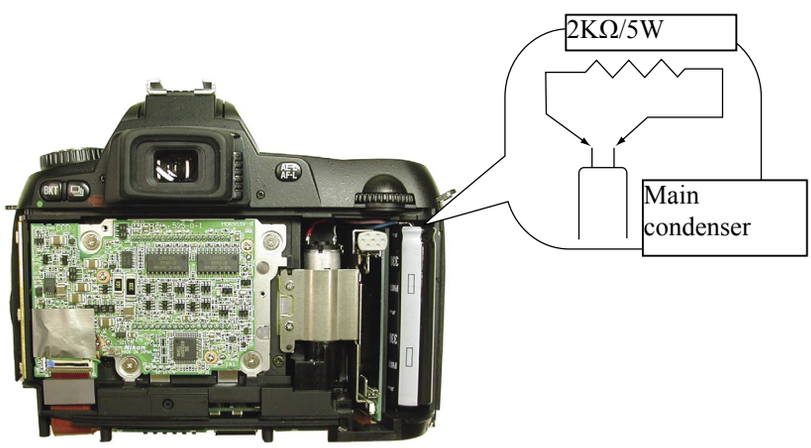
・Take out 4 screws (#612).
・Remove the rear cover.

⚠WARNING

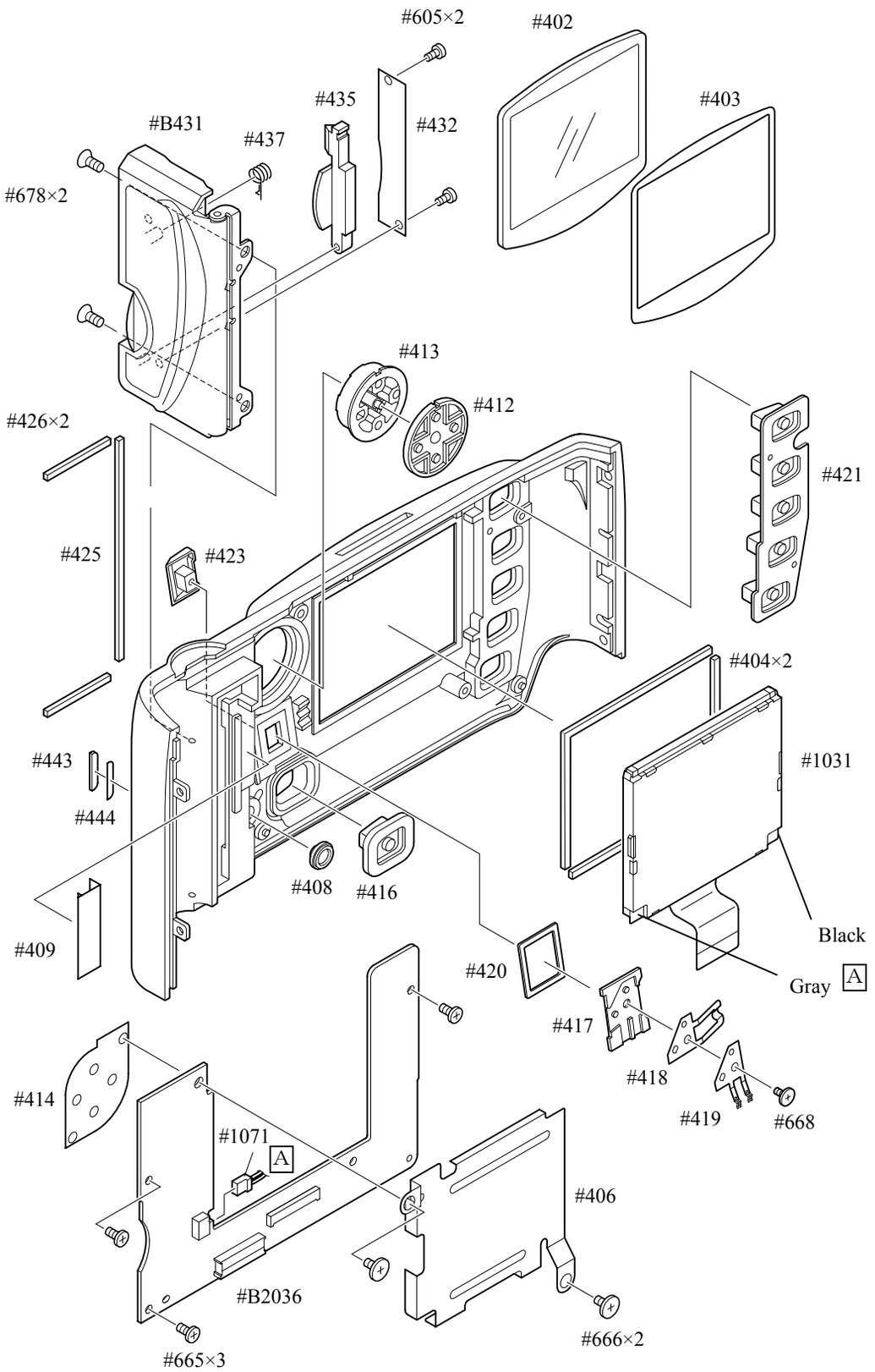
- Due to an internal high voltage area, take extra care not to get an electric shock when detaching the covers.
- After removing the covers, be sure to discharge the main condenser according to the instructions of the repar manuals.

Discharge Main condenser

・Discharge the main condenser from its both ends.

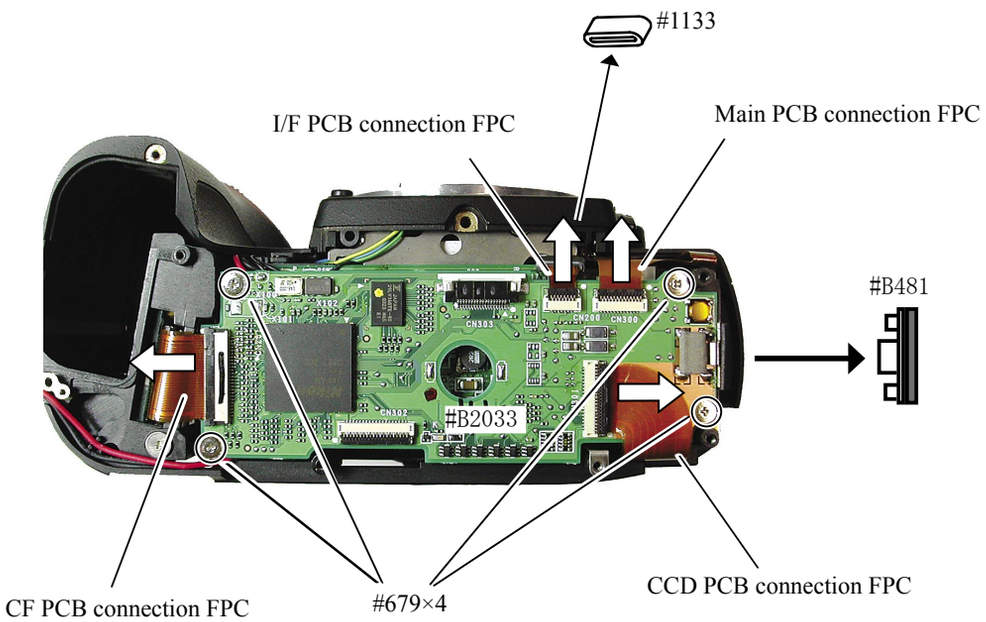


Disassemble Rear cover



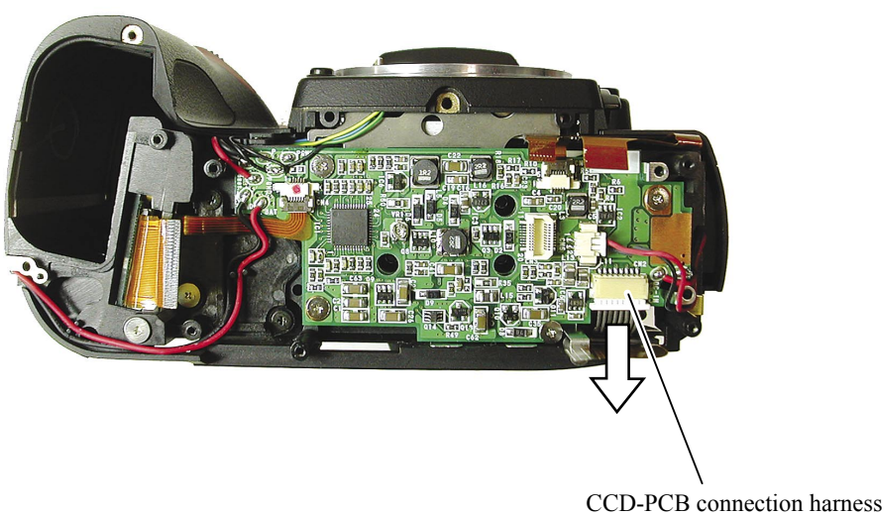
Memory compression PCB

- Remove the USB gasket (#B481) from the memory compression PCB (#B2033).
- Remove the connection FPCs from each connector which are connected from the CF PCB, I/F PCB, main PCB, and CCD PCB.
- Remove the ferrite core (#1133) from I/F PCB connection FPC.
- Take out 4 screws (#679) to detach the memory compression PCB (#B2033).

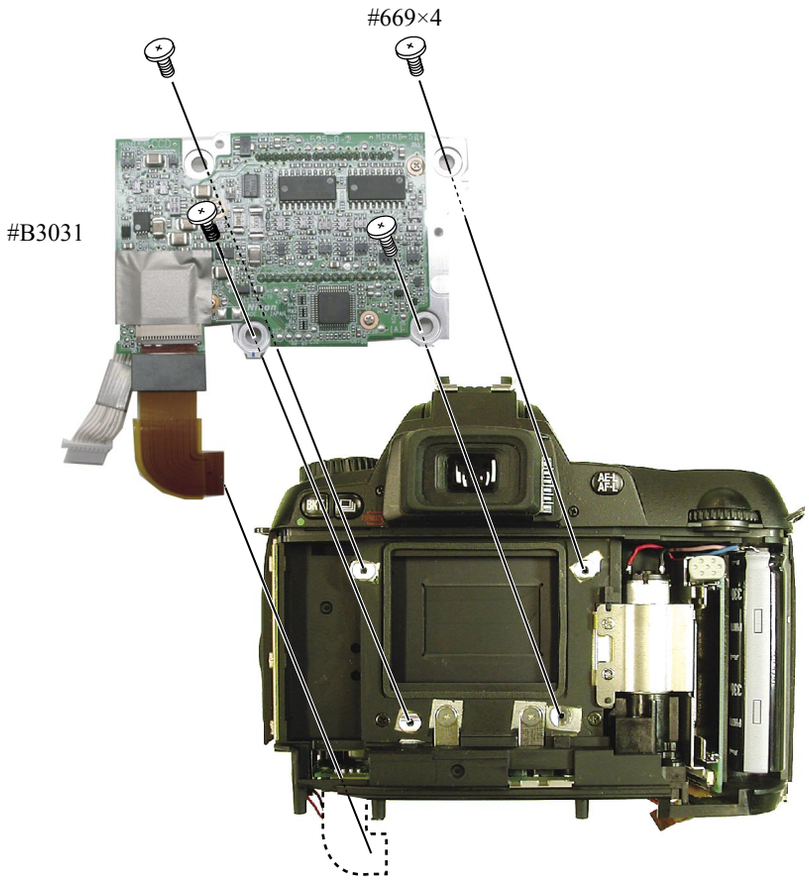


CCD-PCB unit

- Remove the CCD-PCB connection harness.

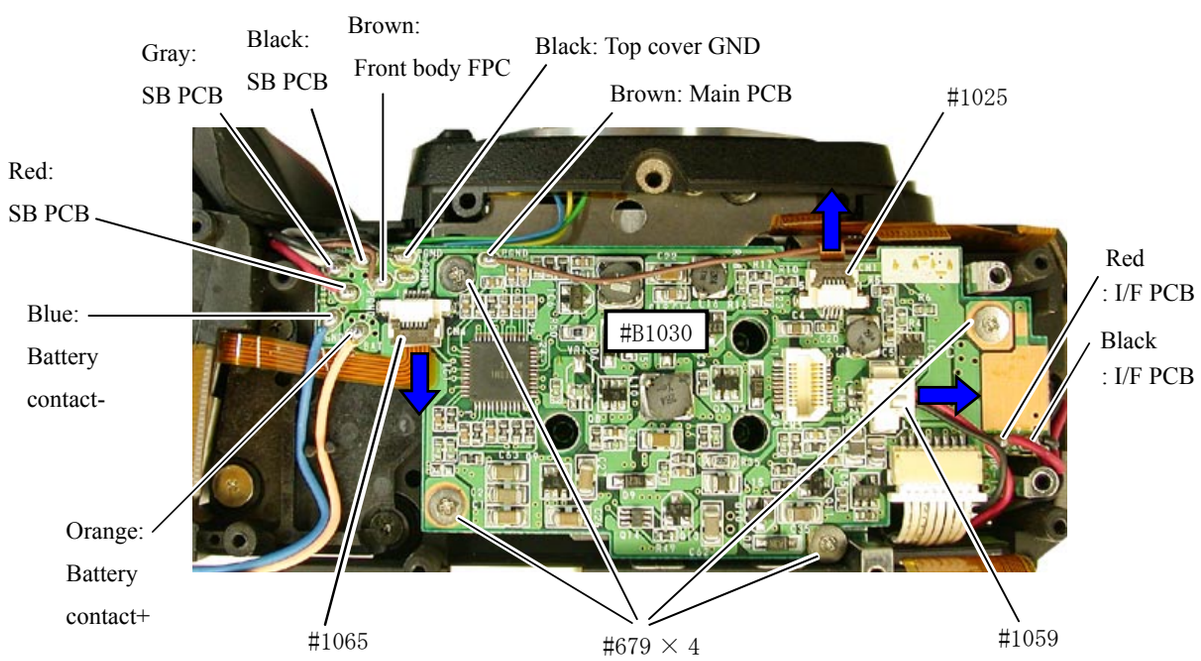


・Take out 4 screws (#669) to detach the CCD PCB unit (#B3031).



DC/DC PCB

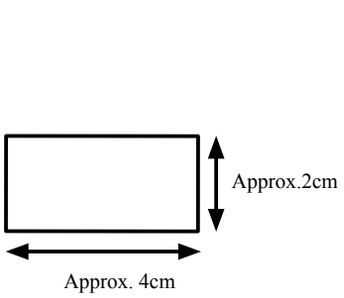
・Remove the solders of 10 wires.
・Disconnect 3 connectors.
・Take out 4 screws (#679) to detach DC/DC PCB (#B1030).



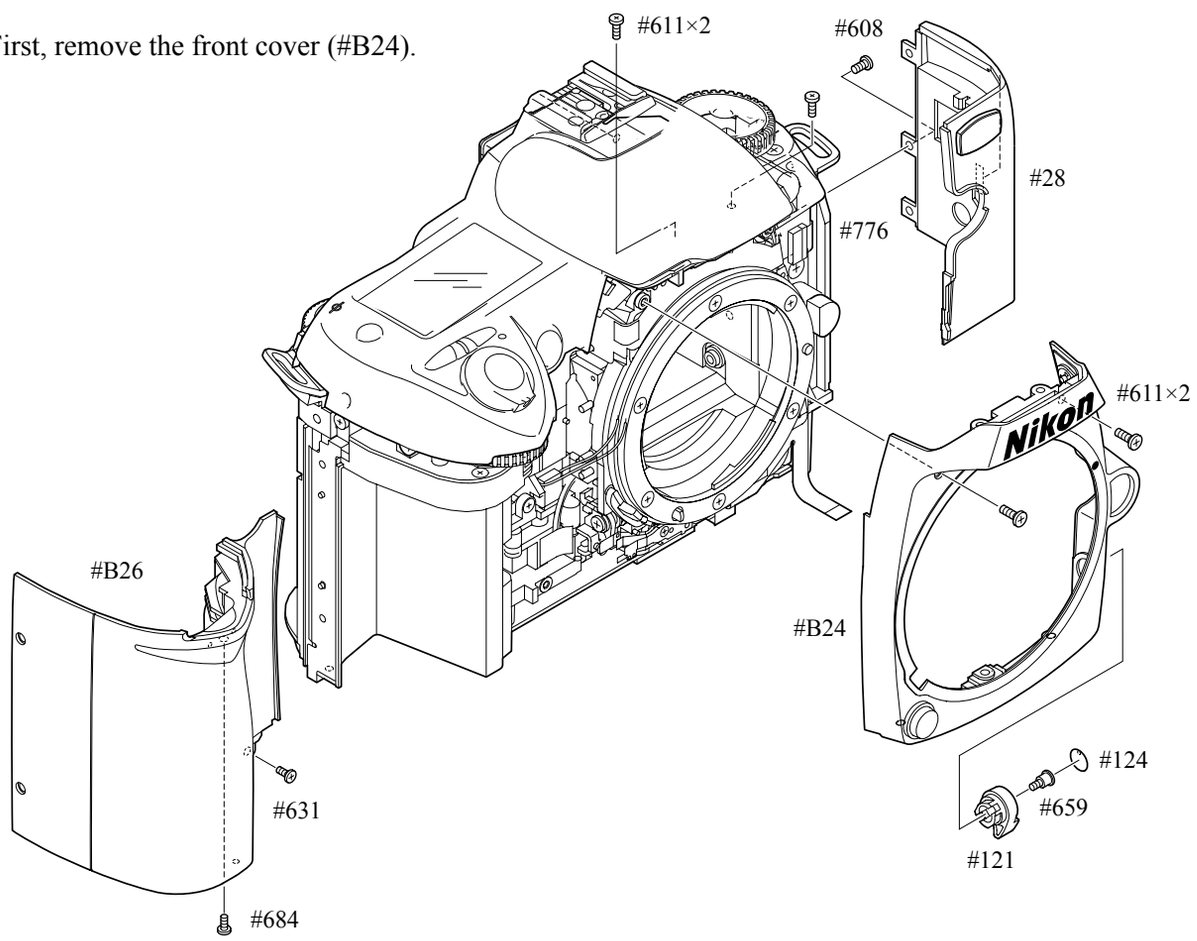
Covers

SB pop-up

・Cut the tracing film sheet, etc into the below size of piece. Then insert it into the clearance of the top cover pop-up part as shown right, and pop it up by sliding the sheet in the direction of the arrow.

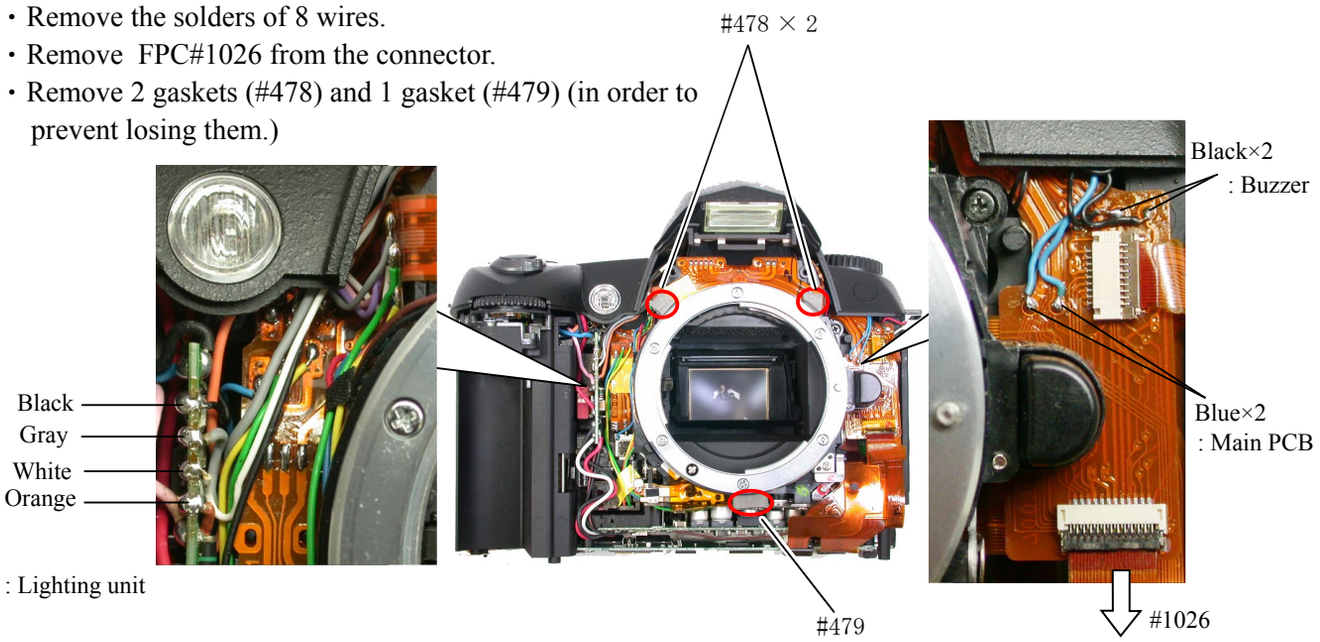


・First, remove the front cover (#B24).

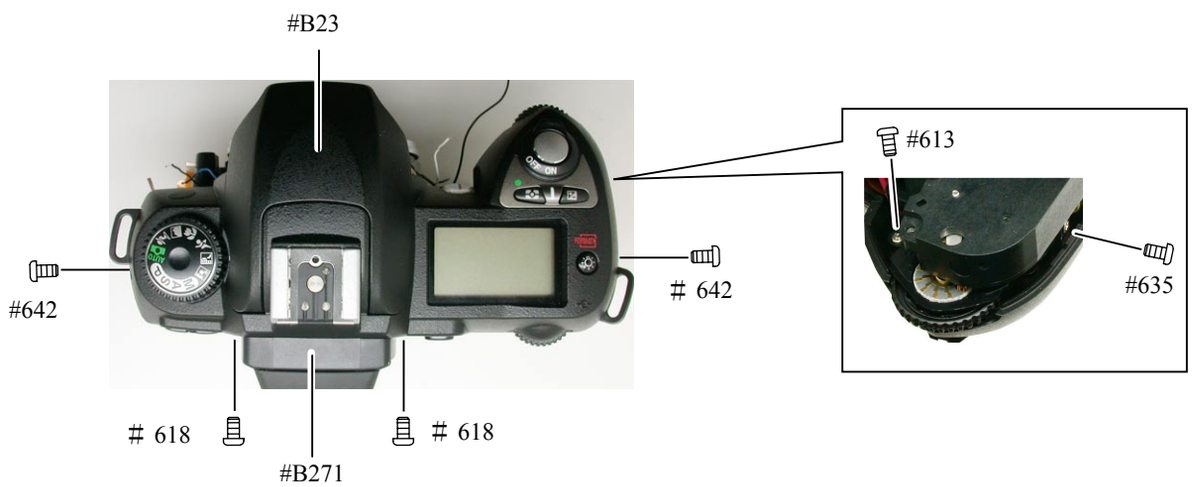


Top Cover

・Remove the solders of 8 wires.
・Remove FPC#1026 from the connector.
・Remove 2 gaskets (#478) and 1 gasket (#479) (in order to prevent losing them.)

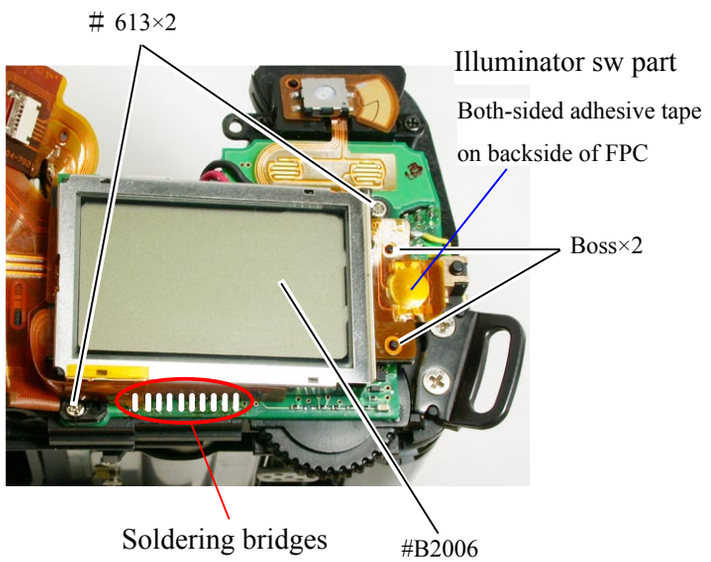


・Take out 6 screws to detach the top cover (#B23). The eyepiece frame (#B271) comes off, too.



External LCD unit

・Remove soldering bridges.
・Lift up the illuminator sw part from the bosses(hub).
・Take out 2 screws(#613) to detach the External LCD (#B2006).



Disassembly of Top cover unit

SB upper case

- Press the pop-up lever A part of the top cover unit so that the built-in SB pops up.
- Take out 2 screws (#631).
- Push from beneath the hooking lever of the SB upper case as shown in Fig.1 . Then slide 2 hooks in the direction of the arrow to remove the lever.
- Deactivate pop-up of the SB lower case unit, and remove the SB upper case. (Fig.2)

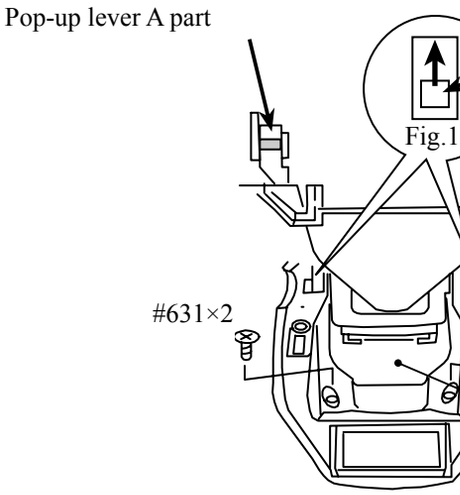


Fig.1

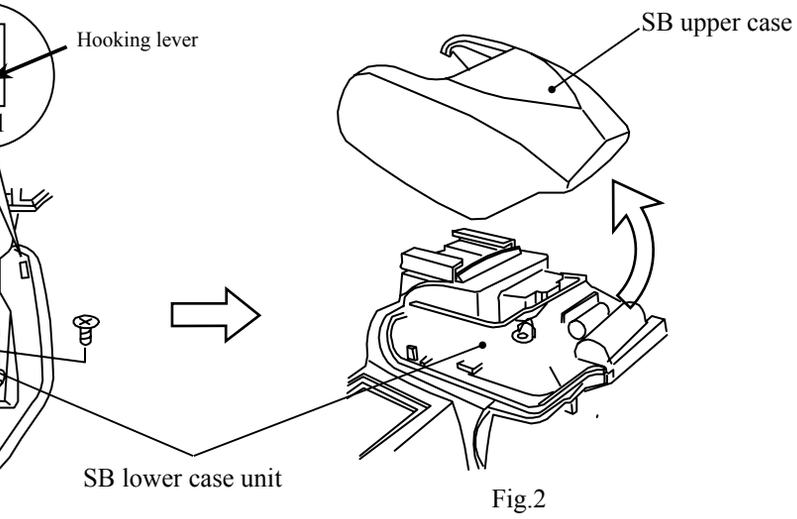
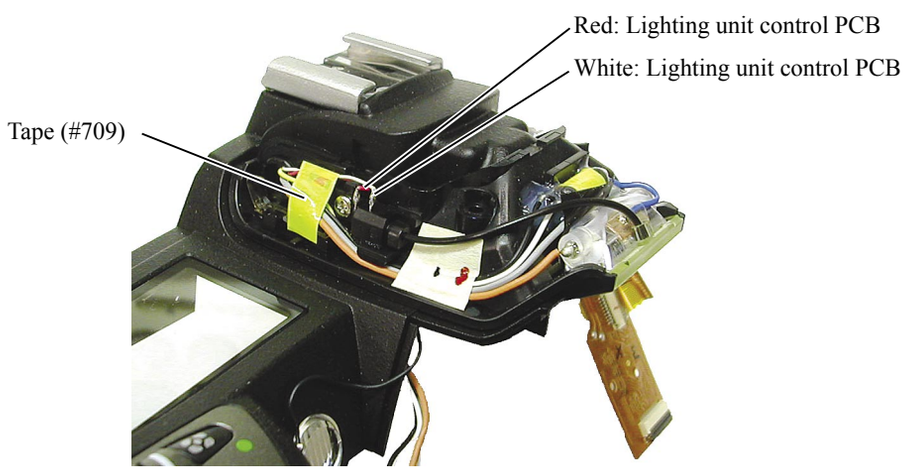


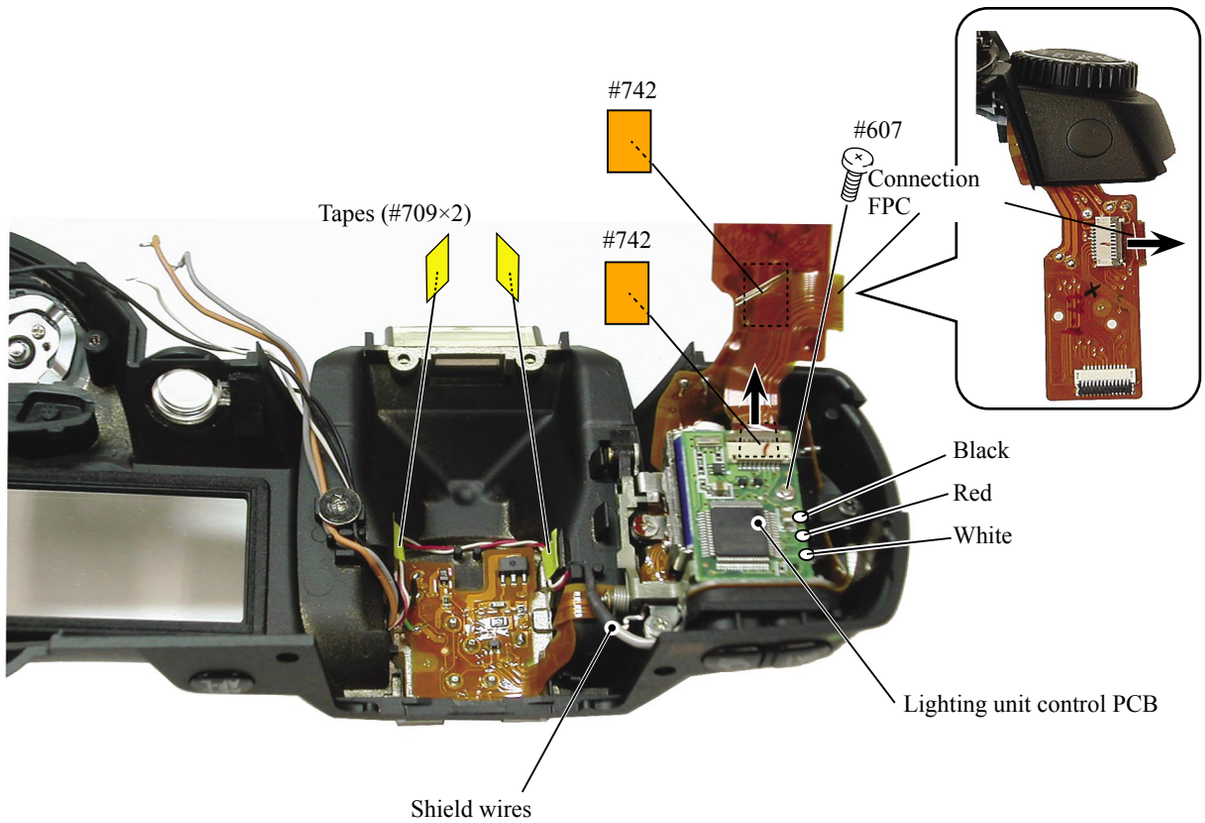
Fig.2

Lighting unit control PCB

Unsolder Shield wires

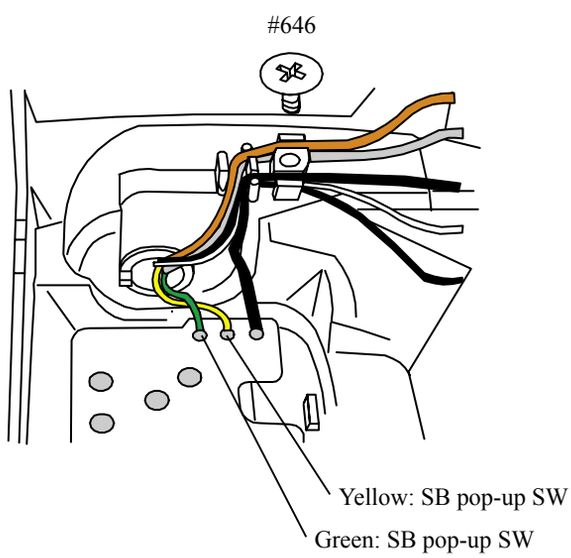


Remove Lighting unit control PCB, connection FPC, and Shield wires



SB lower case unit

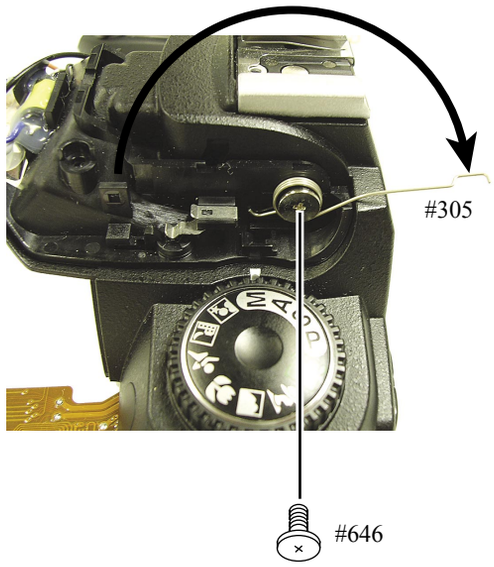
Remove wire-holding screw/Unsolder wires



Remove Flash-up spring

・Unhook the Flash-up spring (#305).

・Take out the screw (#646) and remove the Flash-up spring (#305).



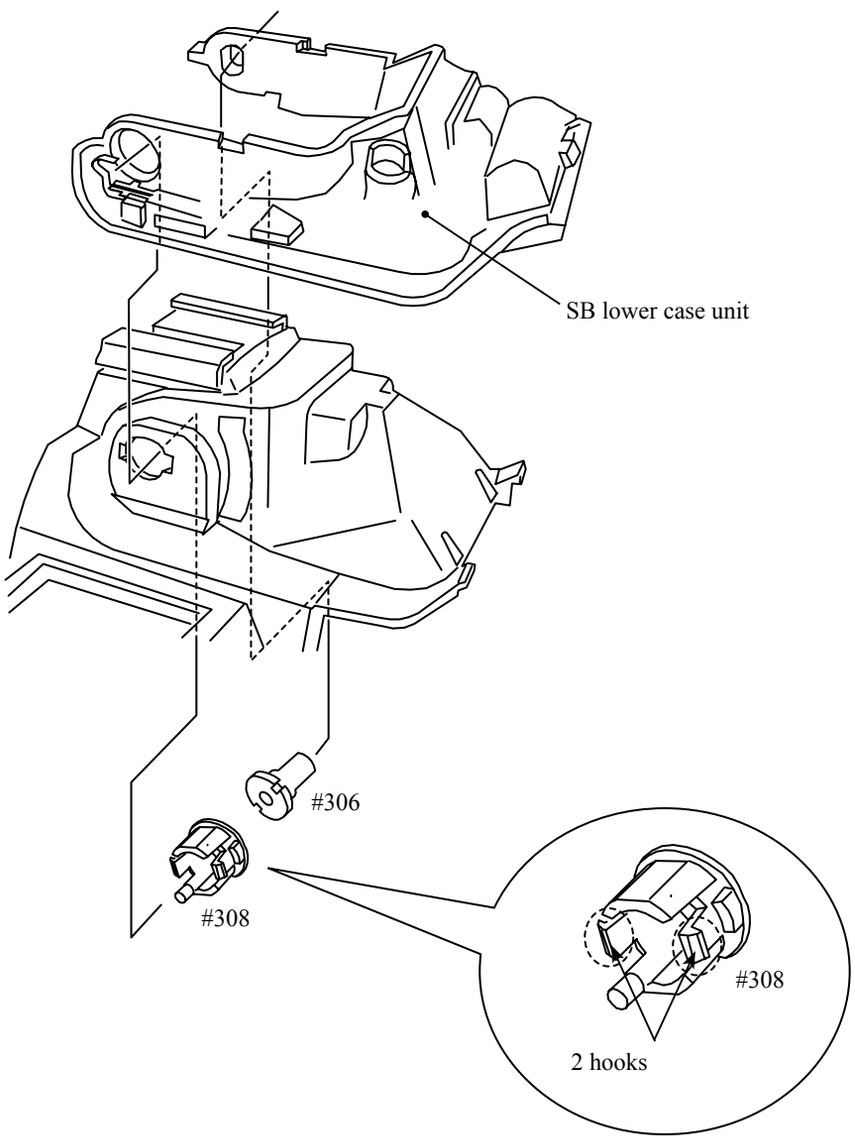
Remove SB lower case unit

・Pull each wire out of holes.

・Losen 2 hooks of the collar (#308) to remove it.

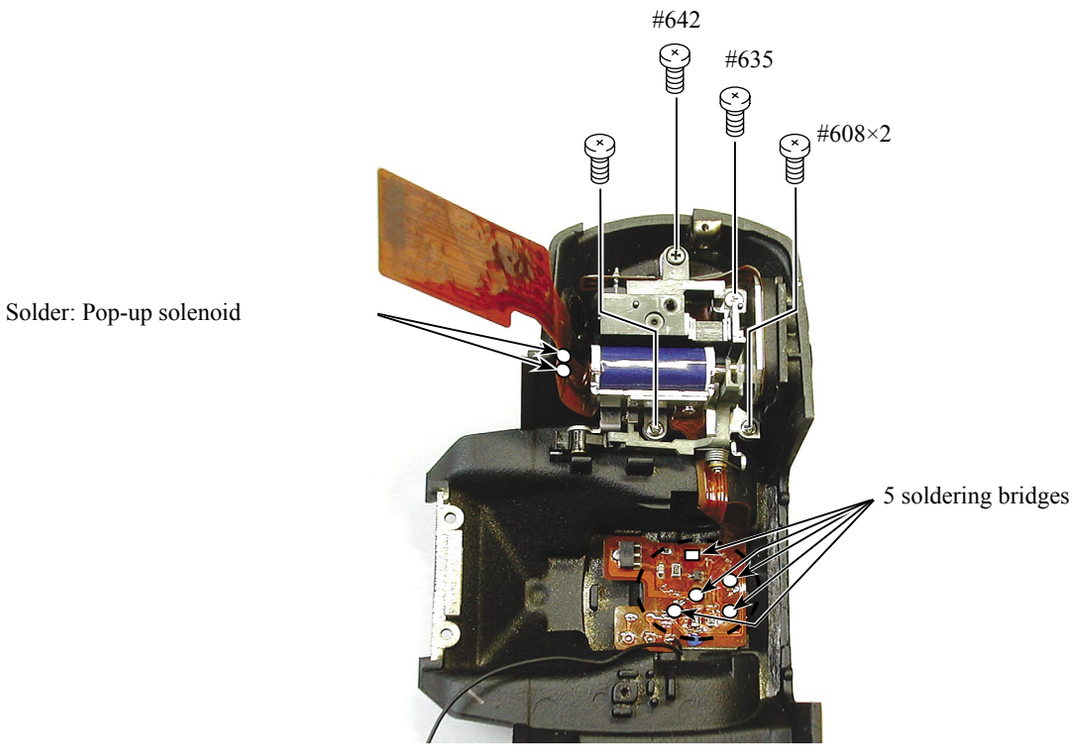
・Remove the SB case axle (#306).

・Detach the SB lower case unit from the top cover.

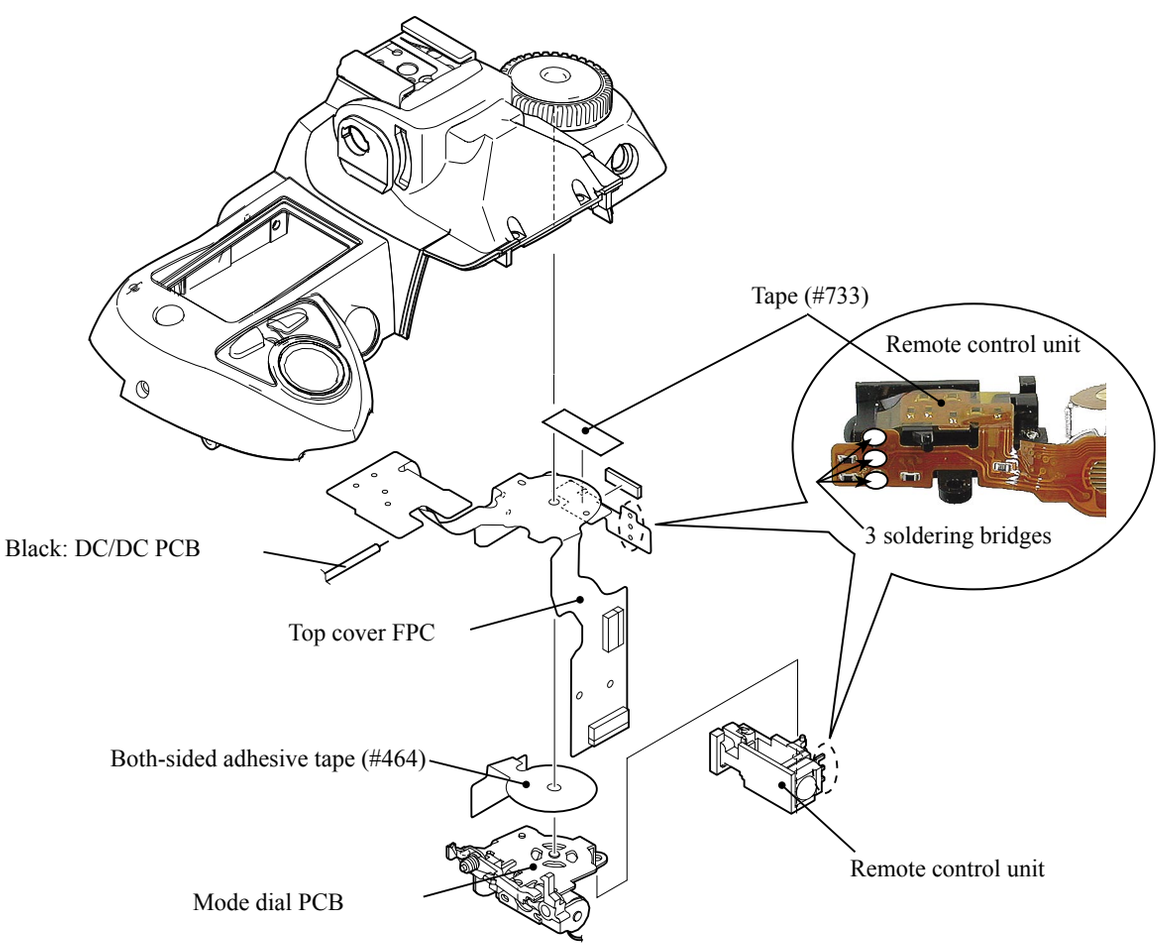


Mode dial PCB unit, Remote control unit, Top cover FPC

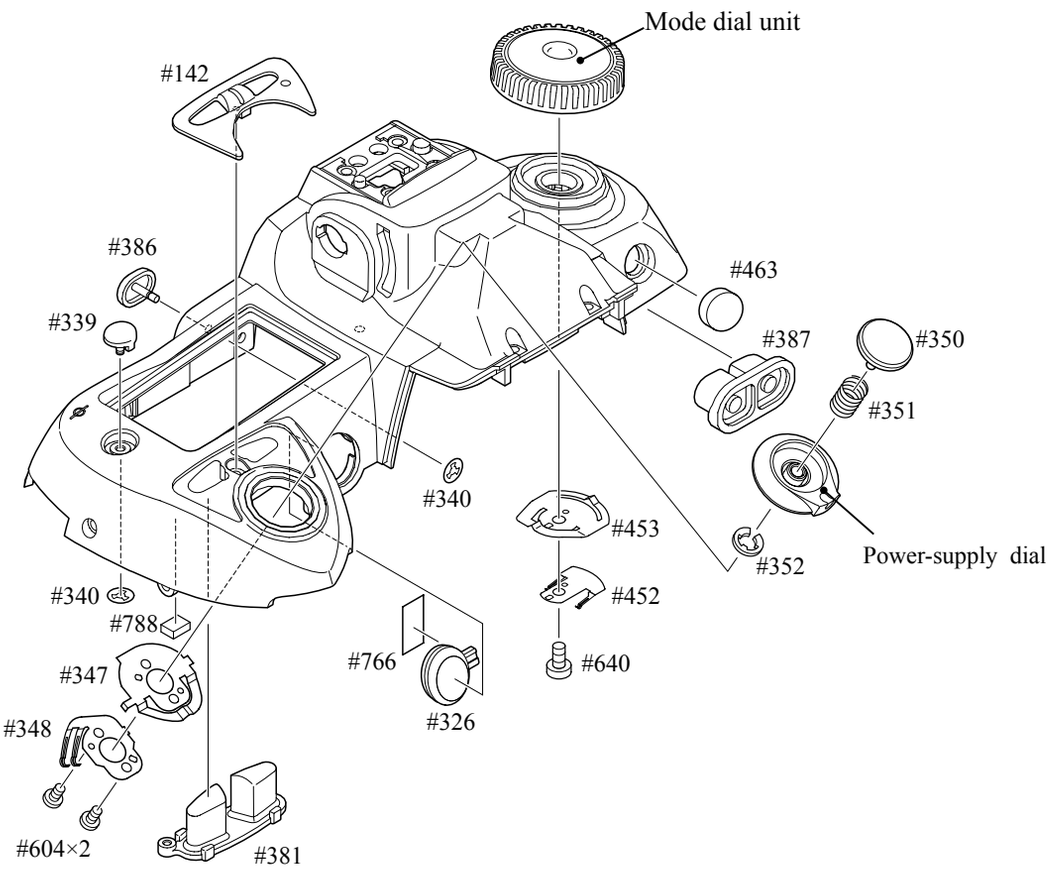
Remove attaching screws, soldering bridges



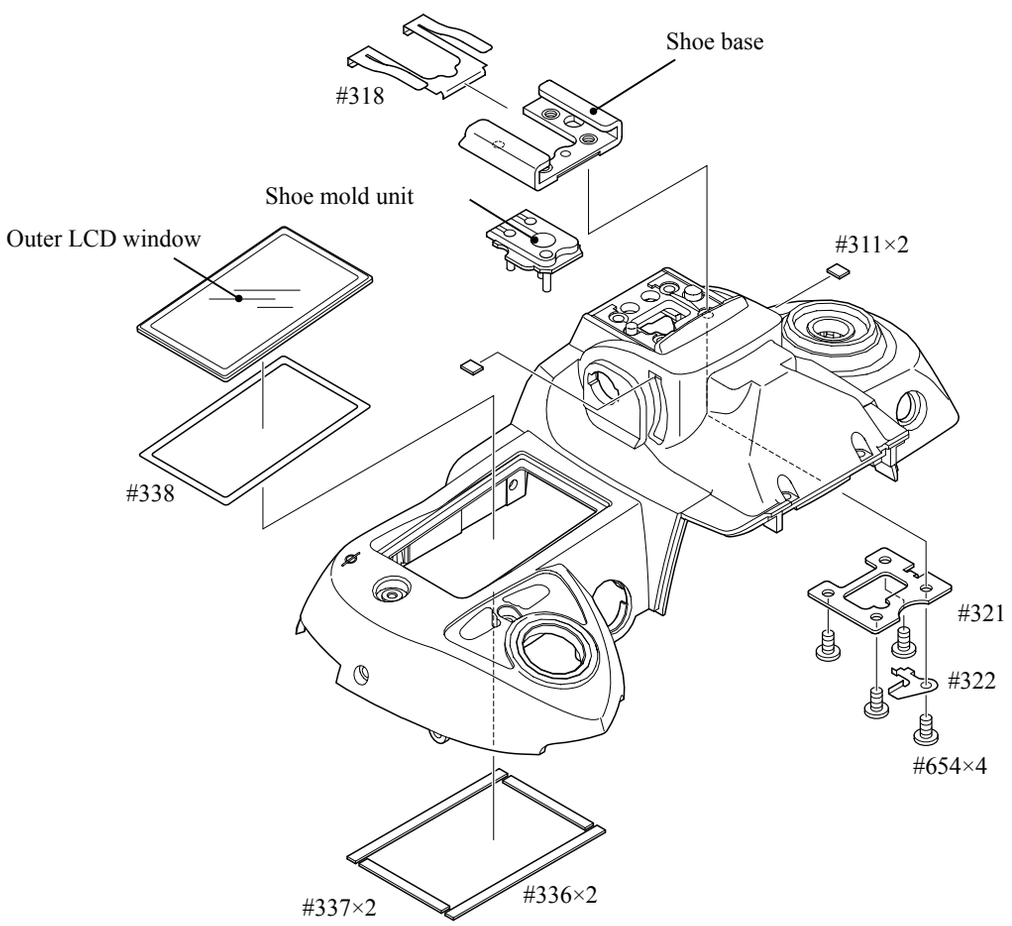
Detach Mode dial PCB and Remote control unit from Top cover FPC



Mode dial unit, Release button, Power-supply dial, other small parts

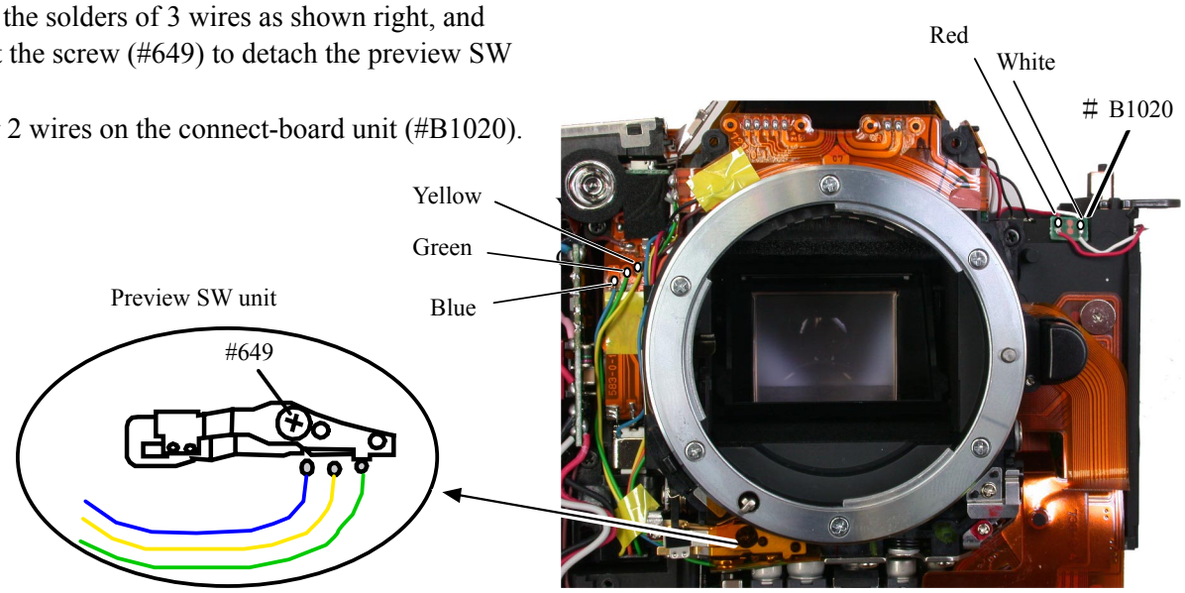


Accessory shoe, Shoe mold unit, Outer LCD window, other small parts



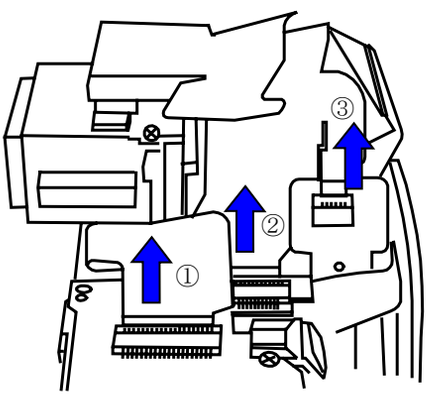
Preview SW unit

- Remove the solders of 3 wires as shown right, and take out the screw (#649) to detach the preview SW unit.
- Unsolder 2 wires on the connect-board unit (#B1020).

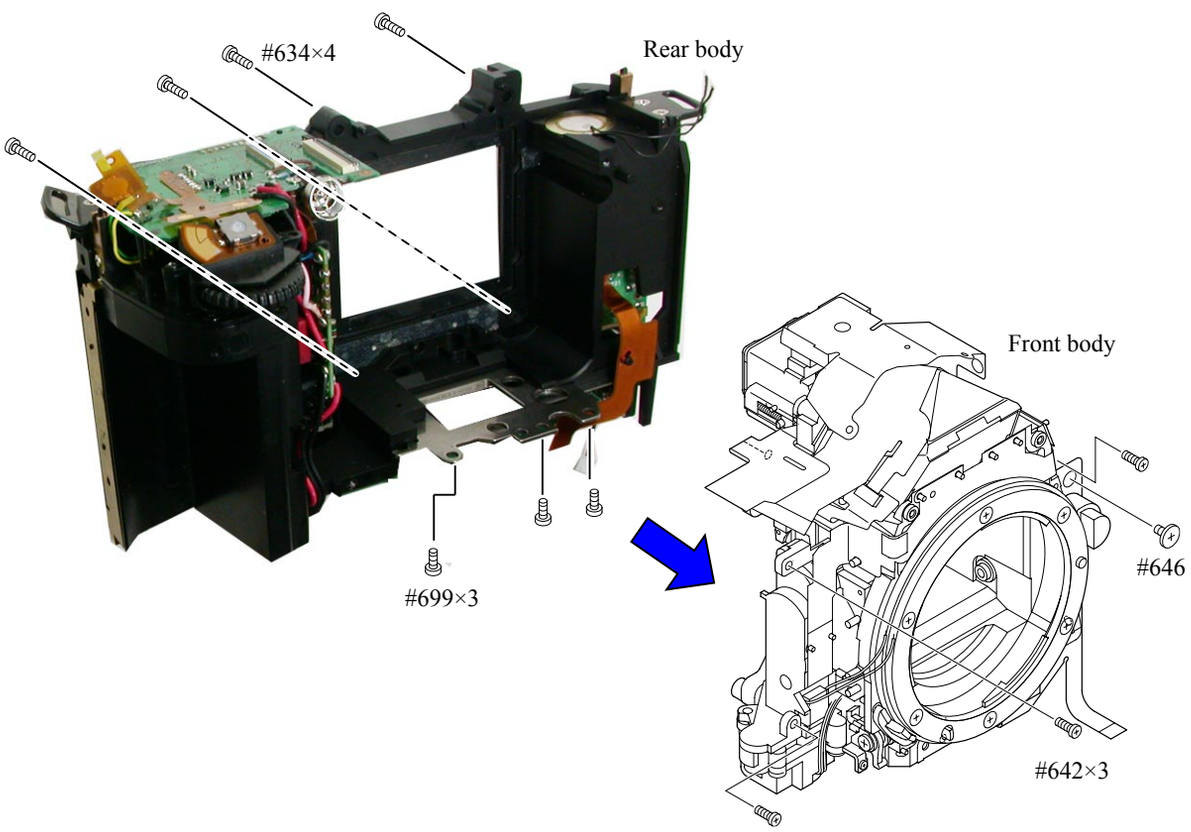


Disconnect from Connectors

- Remove the FPC ① , ② , and ③ from each connector in order.



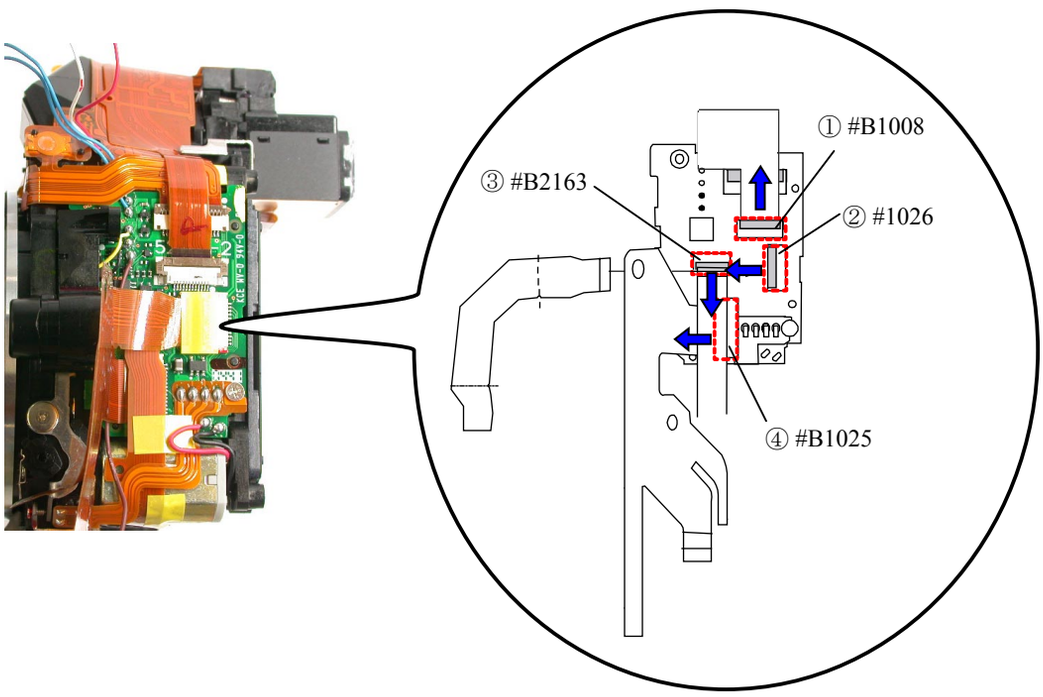
Separate Front and Rear bodies



2. Front Body

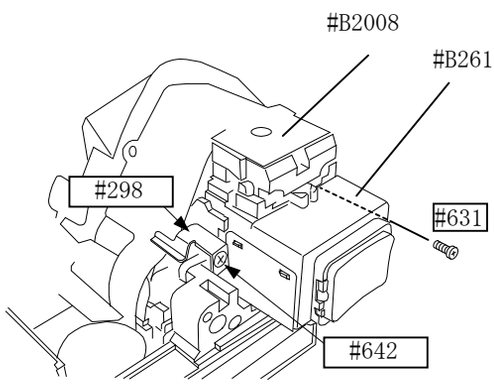
Disconnect Connectors

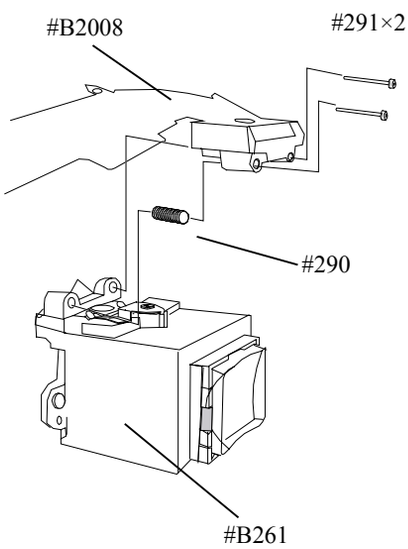
・ Disconnect the FPC ① , ② , ③ , and ④ from each connector in order.



Eyepiece unit
Metering FPC unit

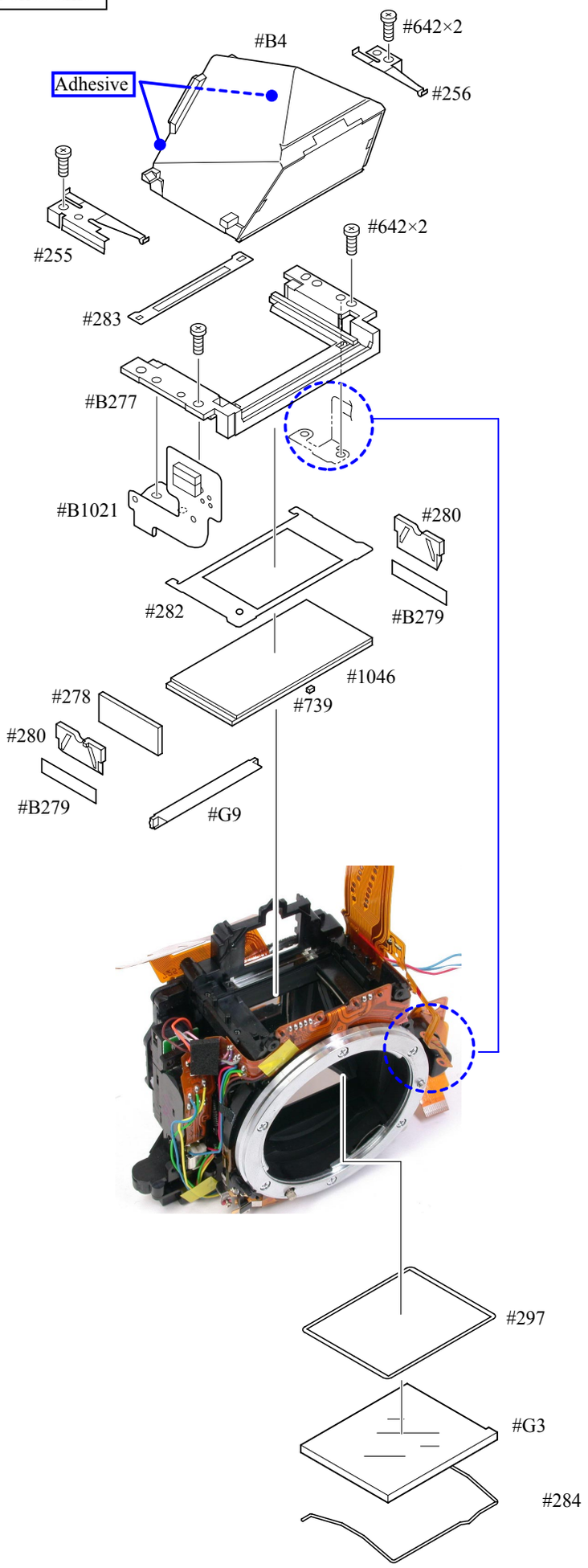
・ Take out the screw (#642) and the plate (#298) . Take out the screw (#631) so that the eyepiece unit (#B261) with the Metering FPC unit(#B2008) attached can be removed.

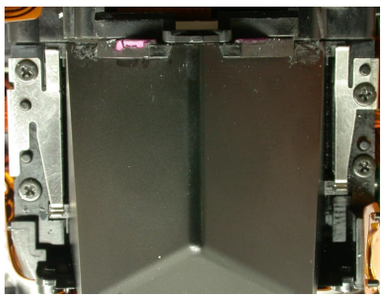


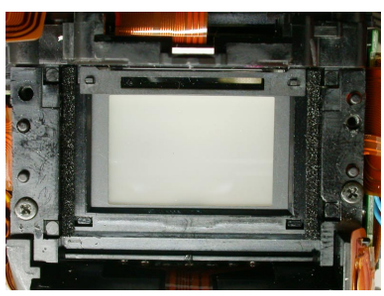


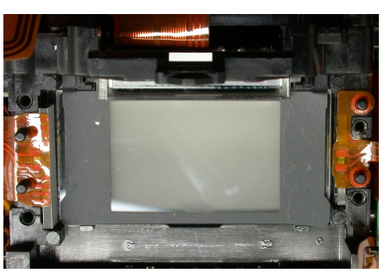
Note: The eyepiece unit (#B261) and Metering FPC unit (#B2008) is attached with the adhesive. Unless replacement is necessary, do NOT disassemble them. In case of disassembling them or turning the screws (#291), AE CCD position adjustment (ref. Assembly Chapter) is necessary.

Penta unit


#B4
#642×2
Adhesive
#256
#255
#642×2
#283
#B277
#B1021
#280
#282
#B279
#1046
#739
#278
#280
#B279
#G9
#297
#G3
#284

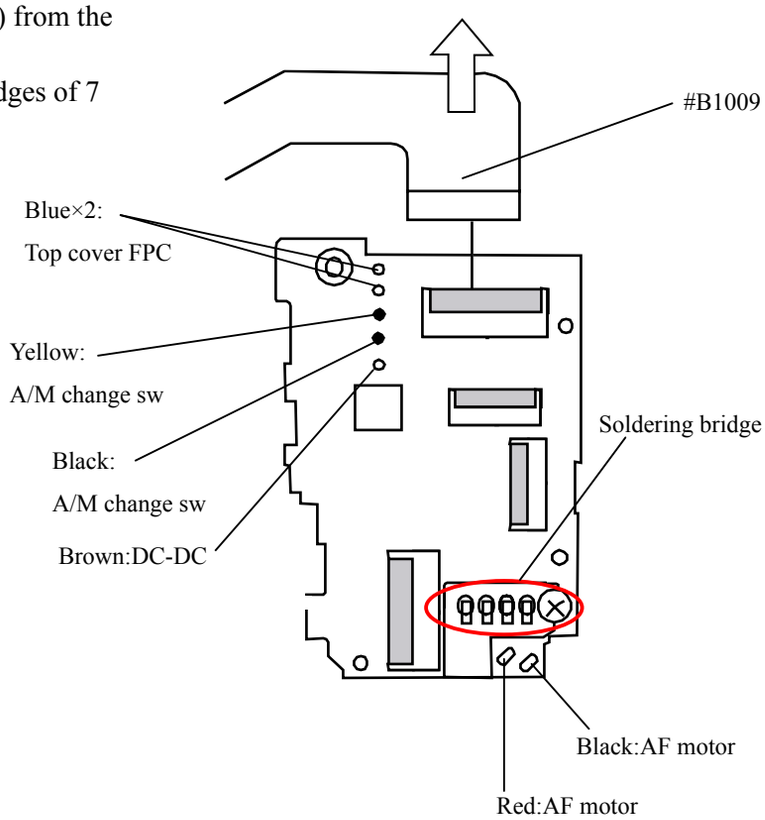




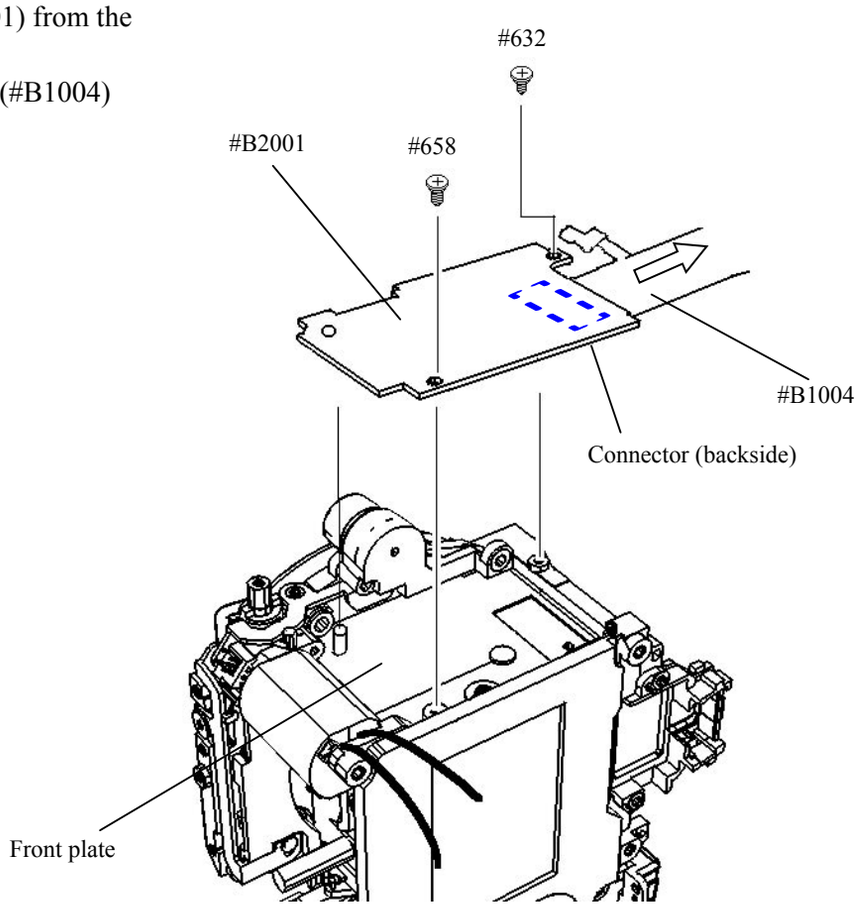


Main PCB

- Remove the front body FPC (#B1009) from the connector.
- Remove the solders and soldering bridges of 7 wires.

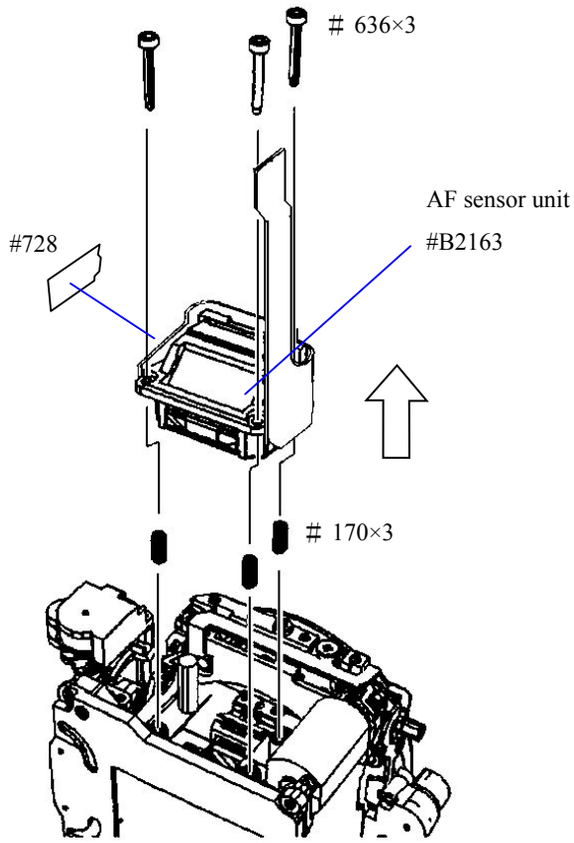


- Take out the screws (#658 and #632) to detach the main PCB (#B2001) from the front plate.
- Remove the connection FPC (#B1004) from the connector.



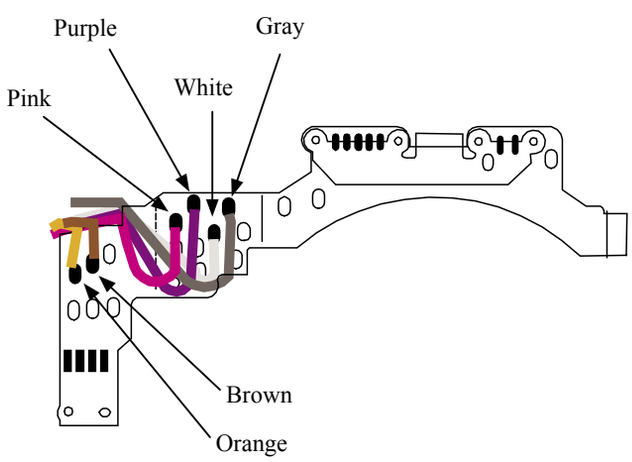
AF sensor unit

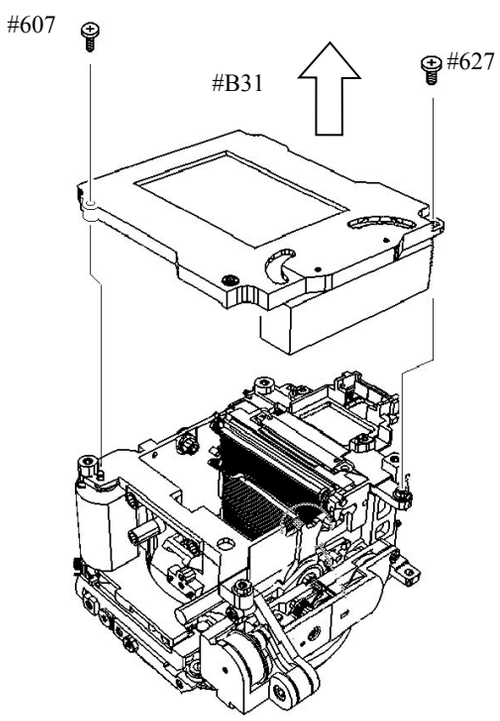
・Take out 3 screws (#636) with Hexagonal wrench, and remove the AF sensor unit (#B2163).
・3 springs (#170) come off, too.



Shutter unit

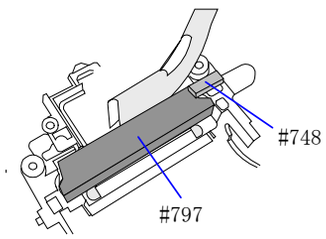
・Remove the solders of 6 wires.
・Take out the screws (#607 and #627) to detach the shutter unit (#B31).

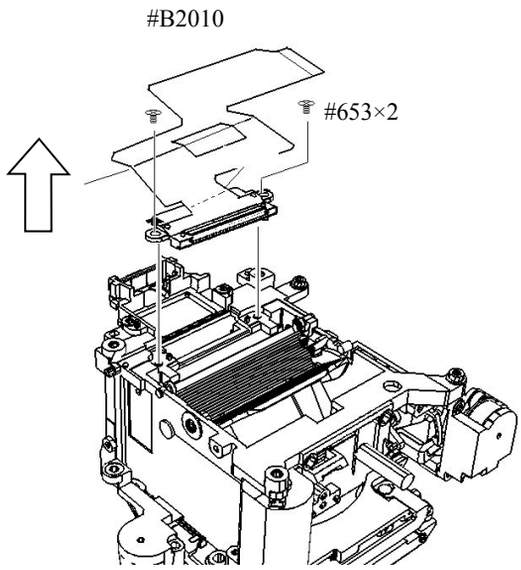




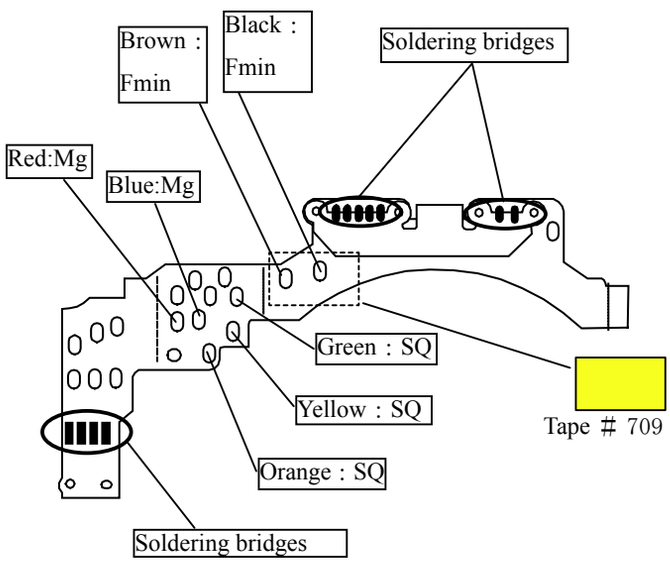
Inner LCD unit

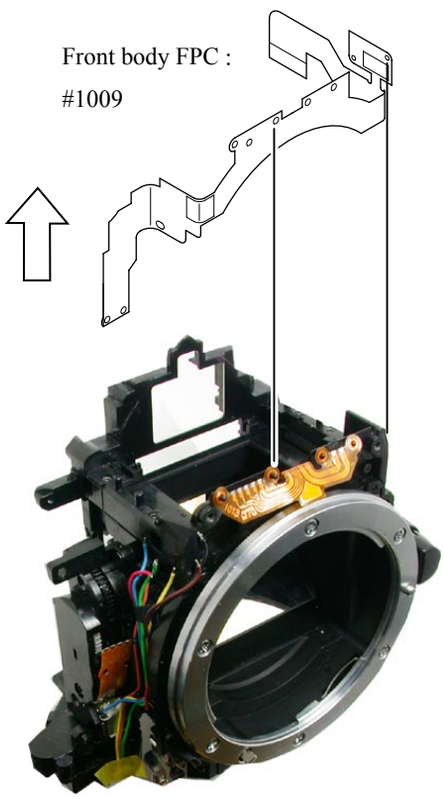
・Remove the sponge (#797 and #748).
・Take out 2 screws (#653) to remove the inner LCD unit (#B2010).





Front body FPC





Aperture control unit

Procedure

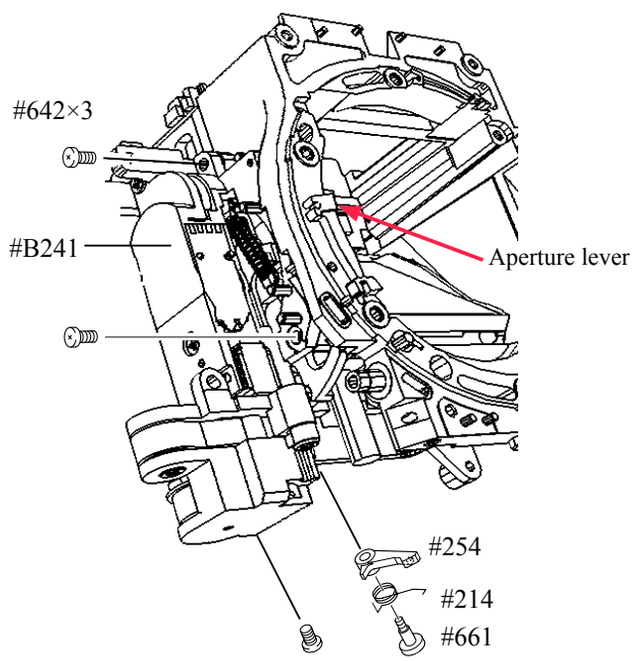
1.Lock the mirror-up lever (#203) with the preview locking lever (#222).

2.Take out 3 screws (#642).

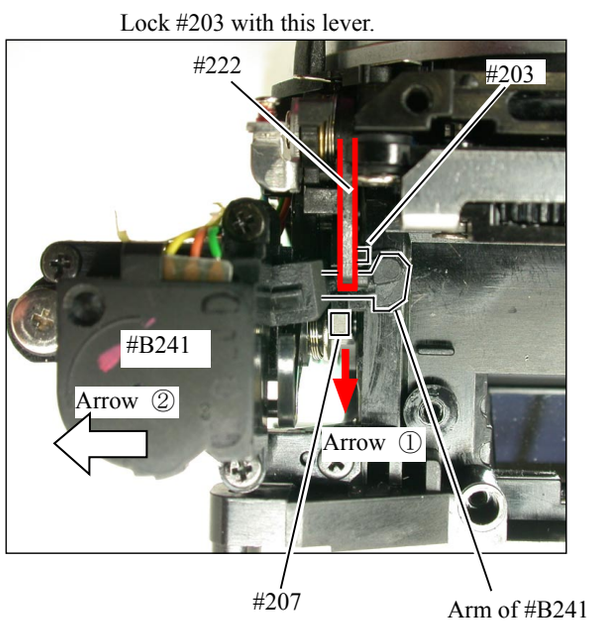
3. Remove the screw (#661), spring (#214) and lever (#254).

4. When the aperture lever is pressed down with finger, the aperture coupling lever (#207) moves in the direction of arrow (①).

5. In state of 4. , remove the aperture control unit (#B241) by pulling it in the direction indicated by arrow (②) while letting the arm (#B241) escape.

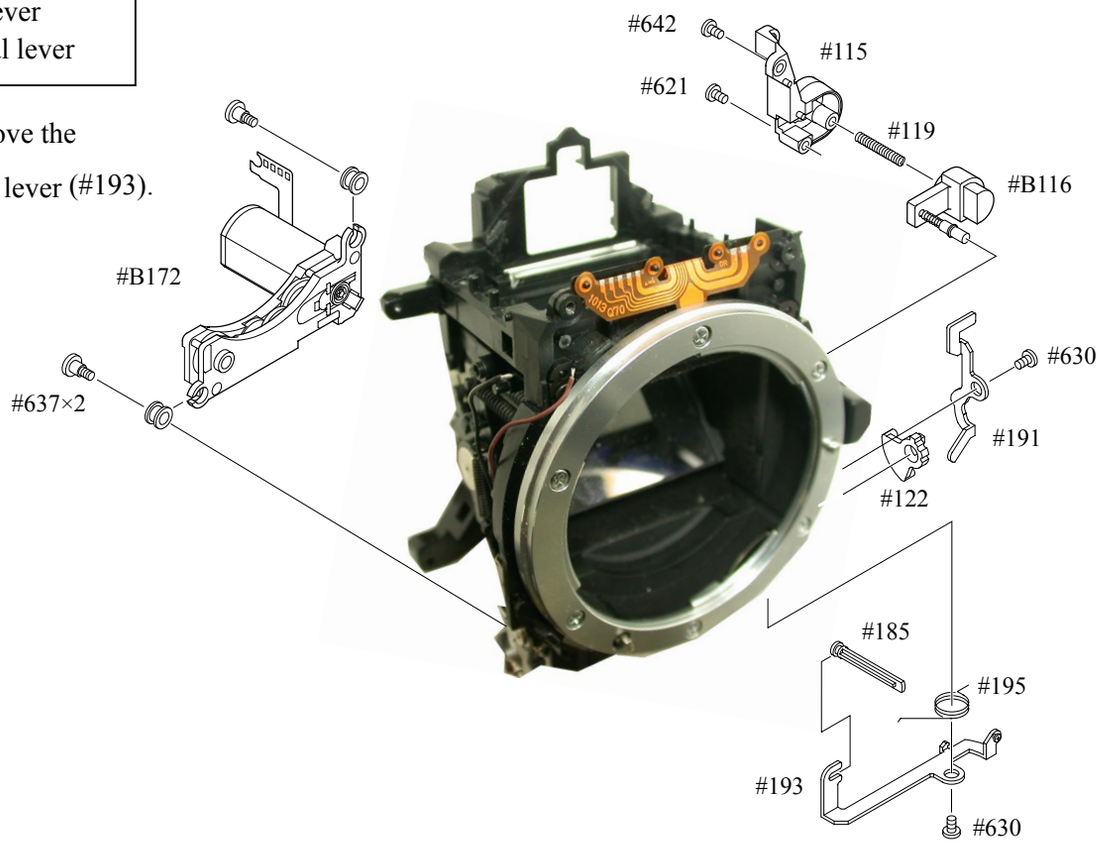


Front body viewed from the bottom

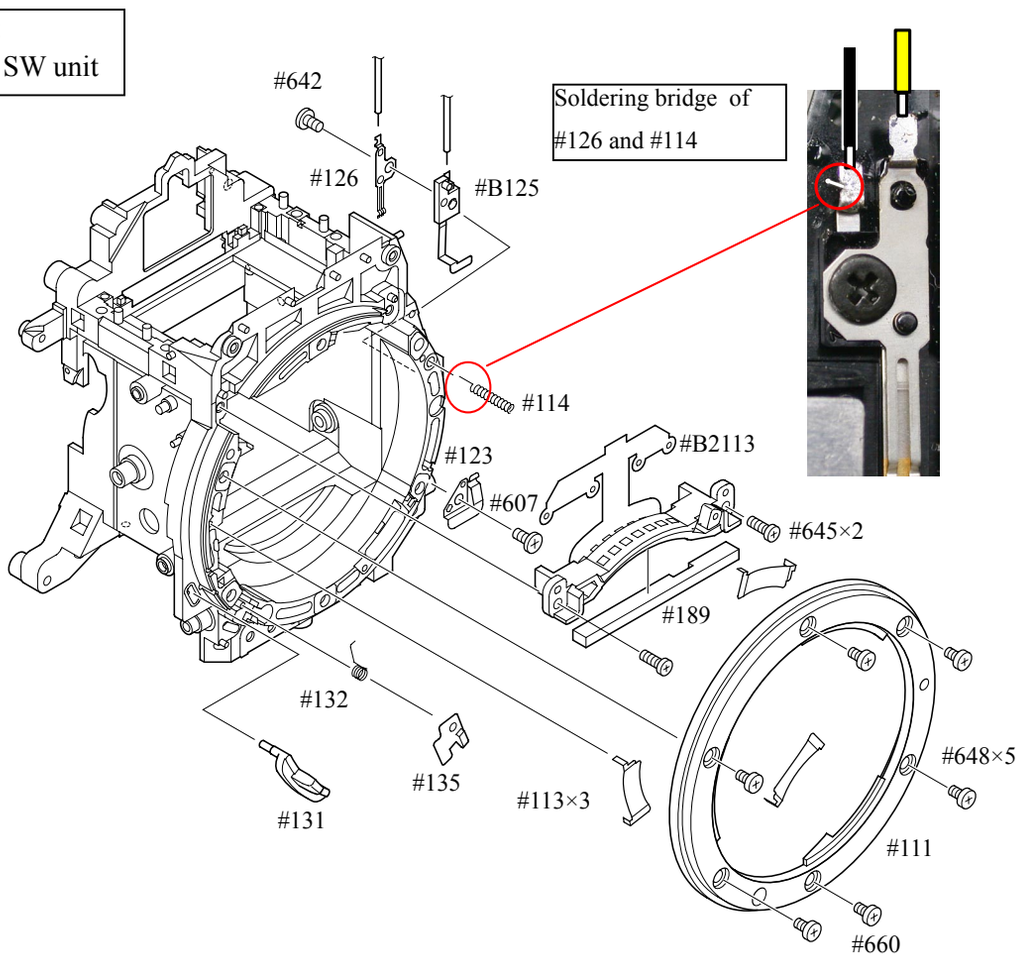


AF driving unit
Lens release button
Vertical lever
Horizontal lever

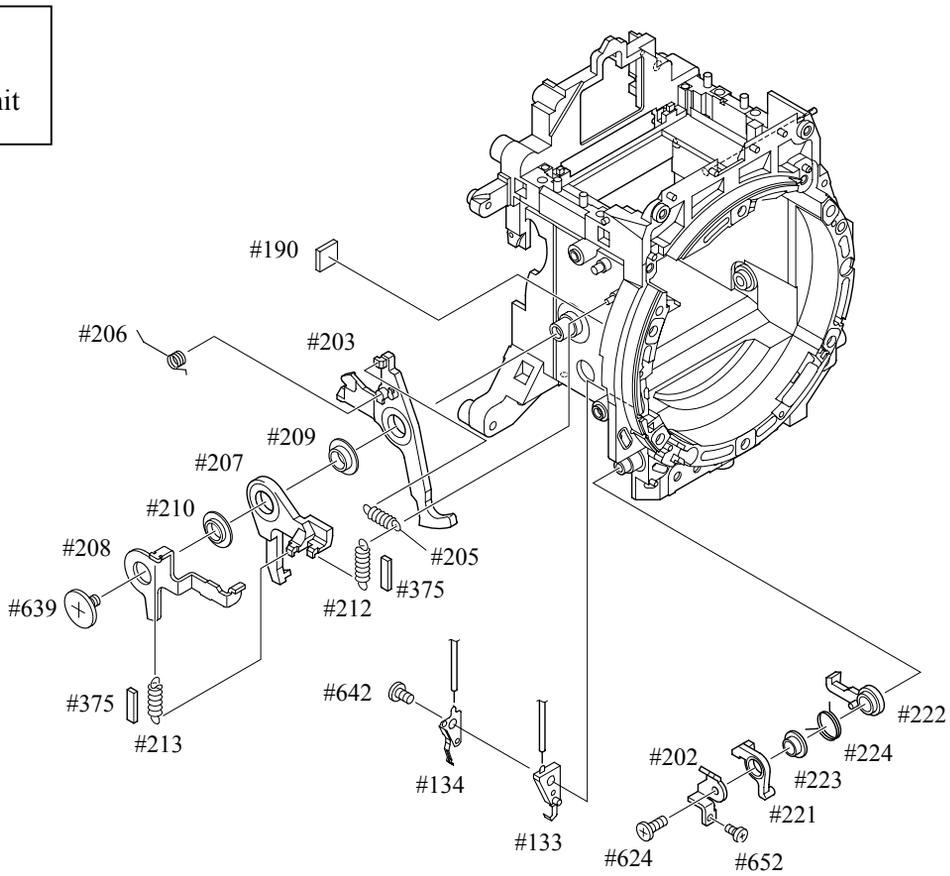
・First, remove the horizontal lever (#193).



Bayonet unit
A/M-change SW unit

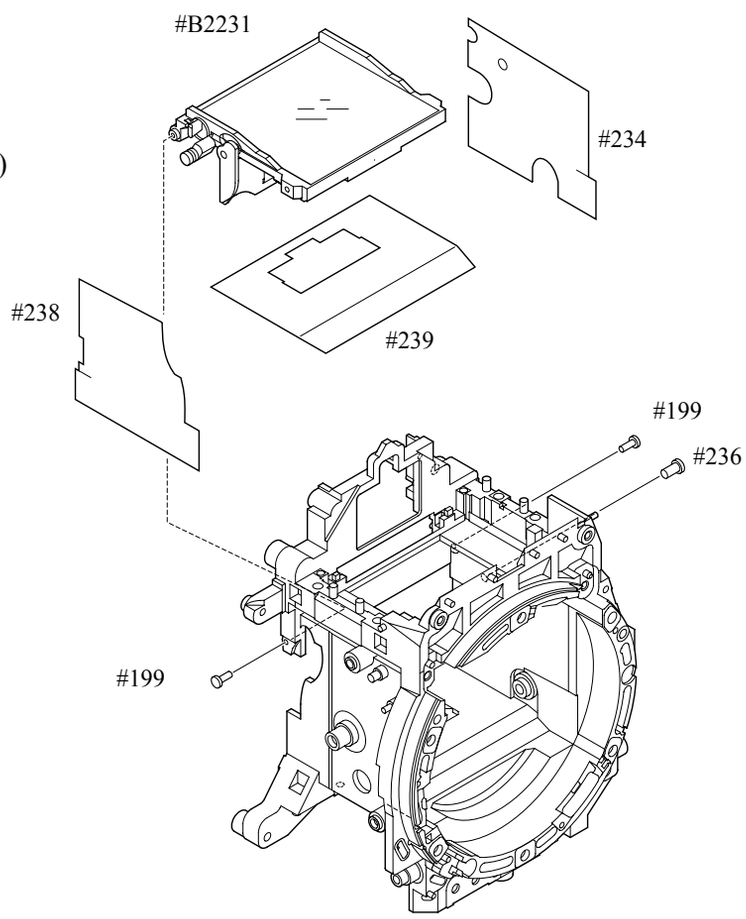


Aperture lever unit
F-min Switch unit
Preview locking lever unit



Mirror unit

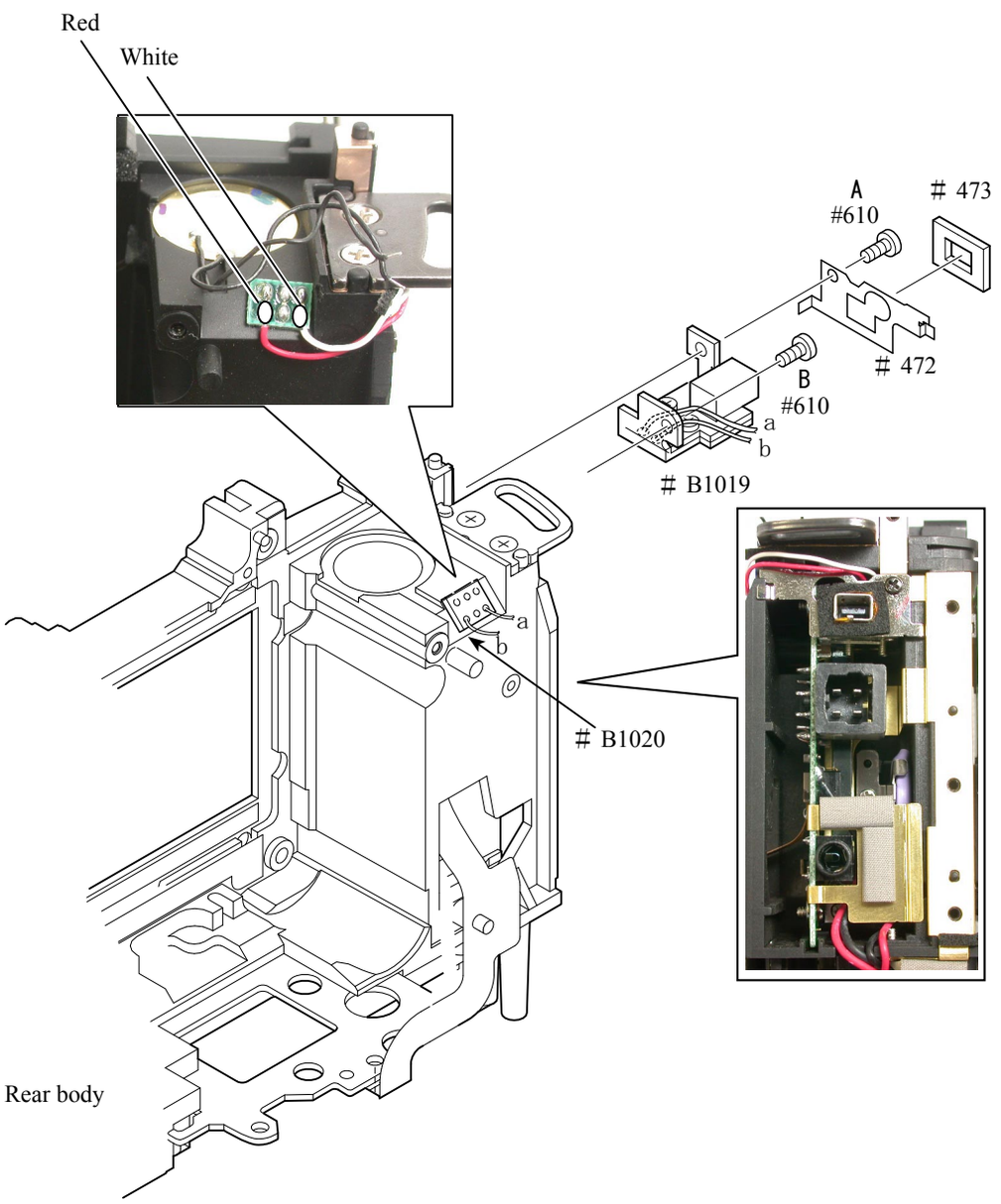
・Note that 2 pins (#199) and the pin (#236) are attached with the Super X.(C-8008B)



3. Rear body

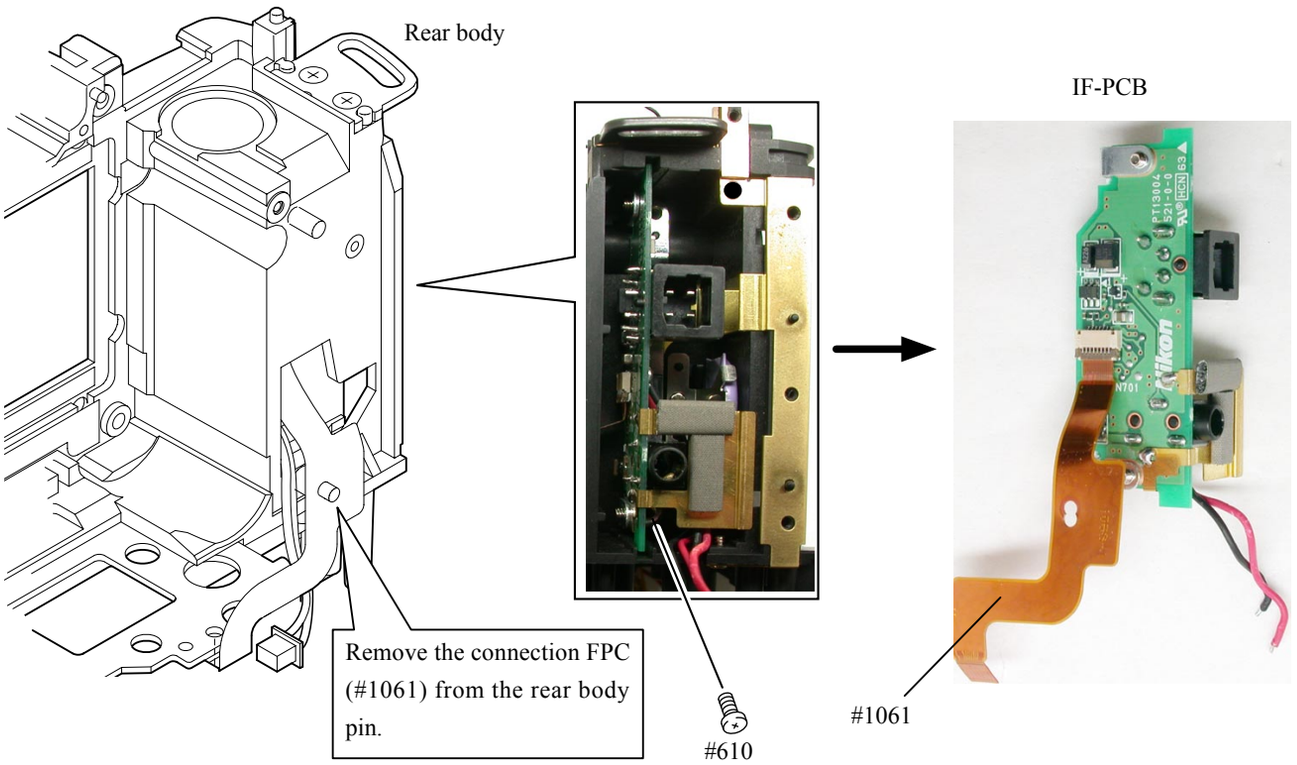
Cable-release main board

- Remove 2 lead wires of the cable-release main board from the connect-board unit (#B1020).
- Take off the screw A(#610) that fixes the connect-hold plate (#472).
- Take off the screwB (#610) to remove the cable-release main board (#B1019).

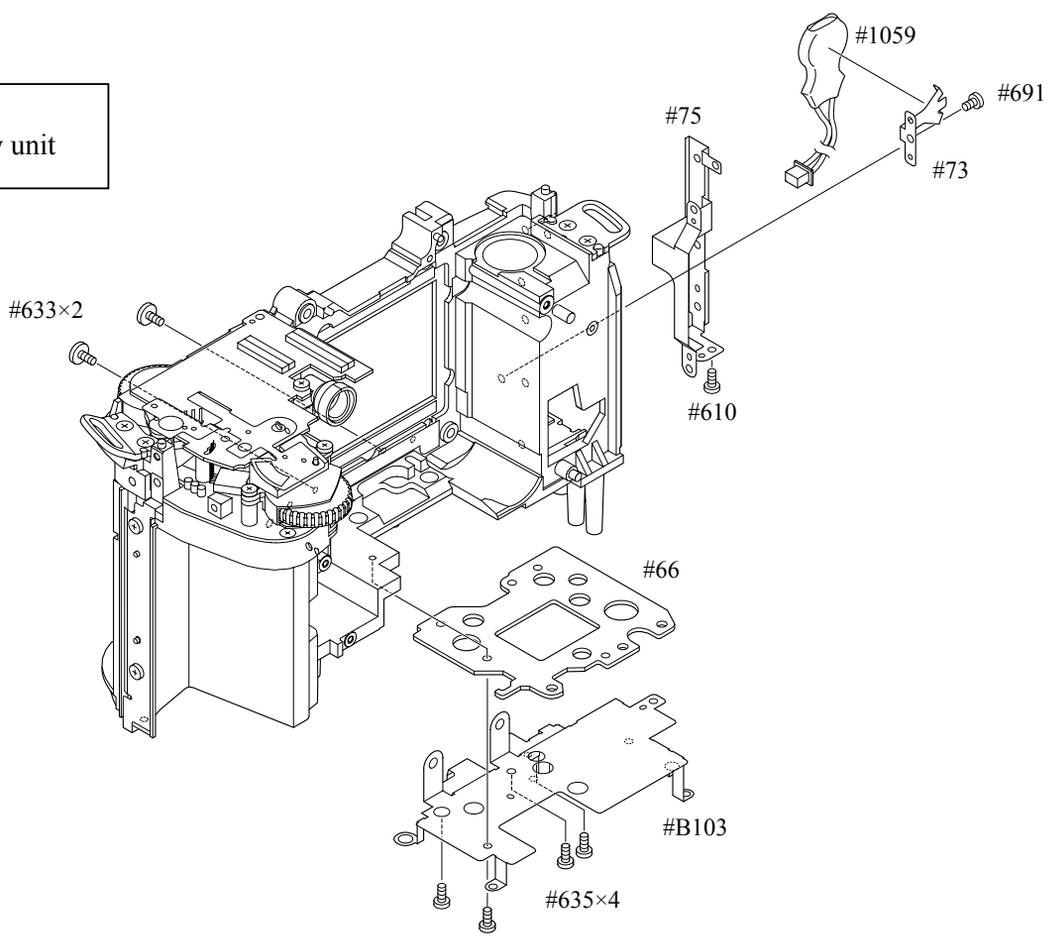


IF-PCB

・Take out the screw (#610) to remove the IF-PCB from the rear body.

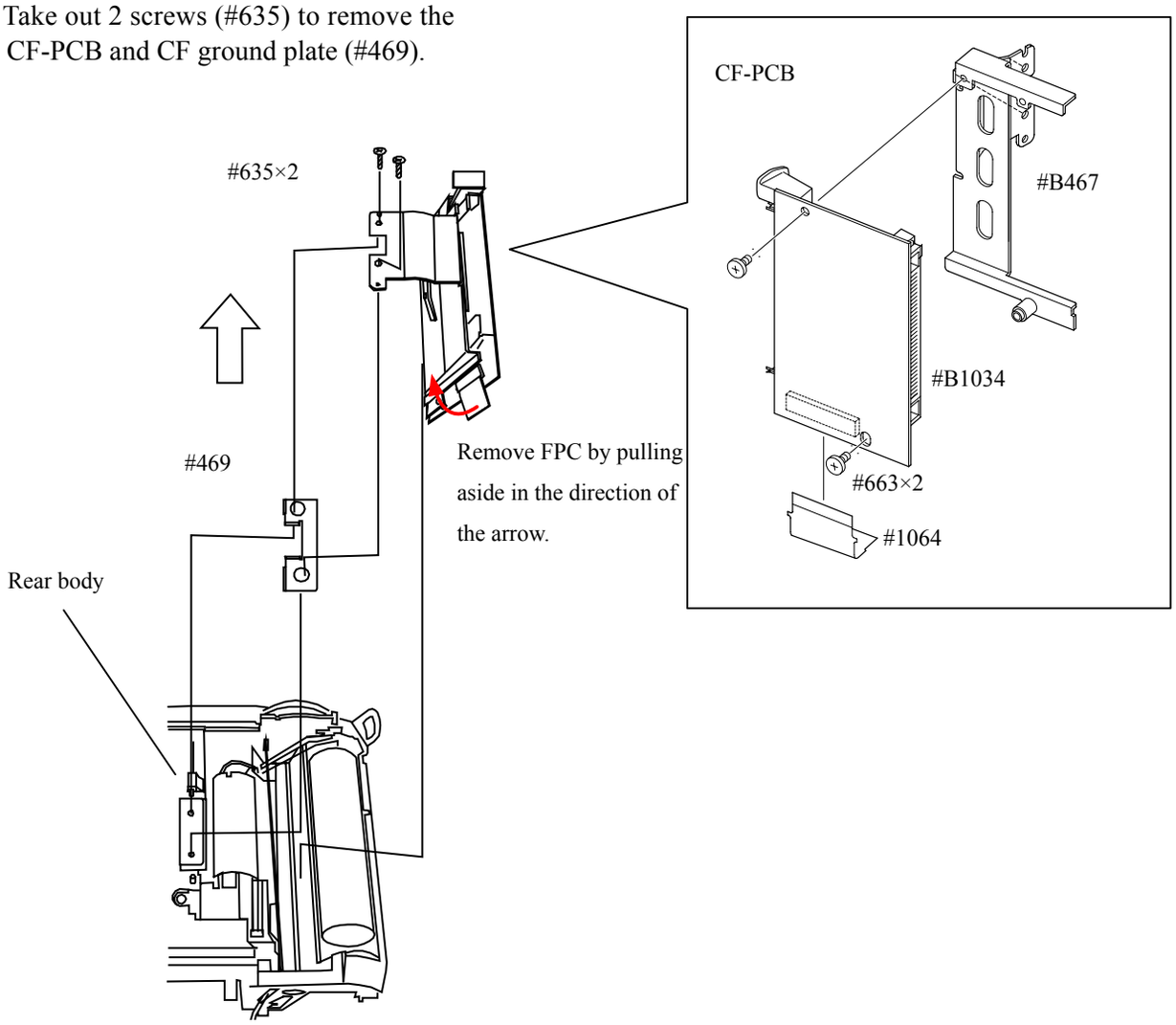


Bottom Base unit
Secondary battery unit



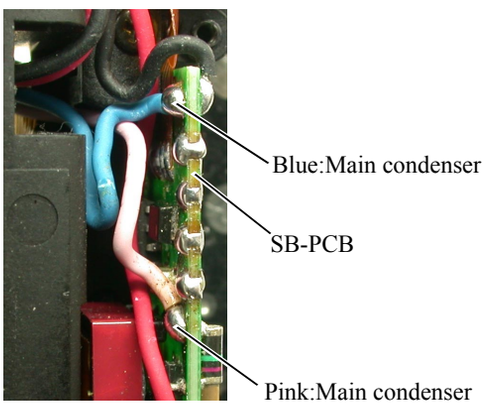
CF-PCB

・Take out 2 screws (#635) to remove the CF-PCB and CF ground plate (#469).

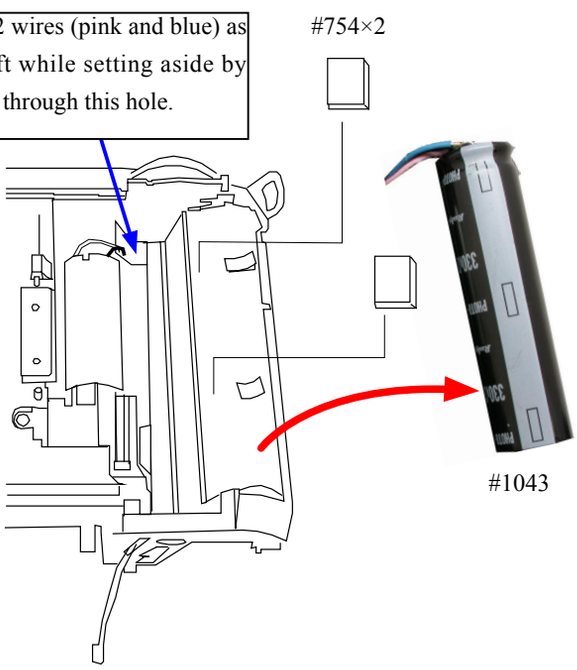


Main condenser

Remove the solders of 2 wires (pink and blue) on the SB-PCB of the front of the rear body.

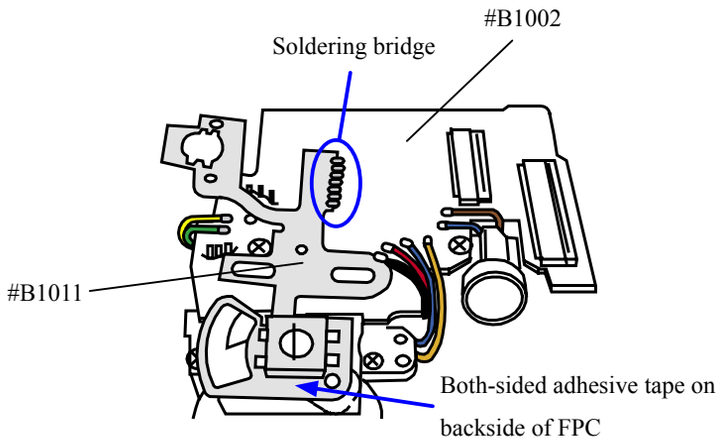


Remove the 2 wires (pink and blue) as described left while setting aside by passing them through this hole.



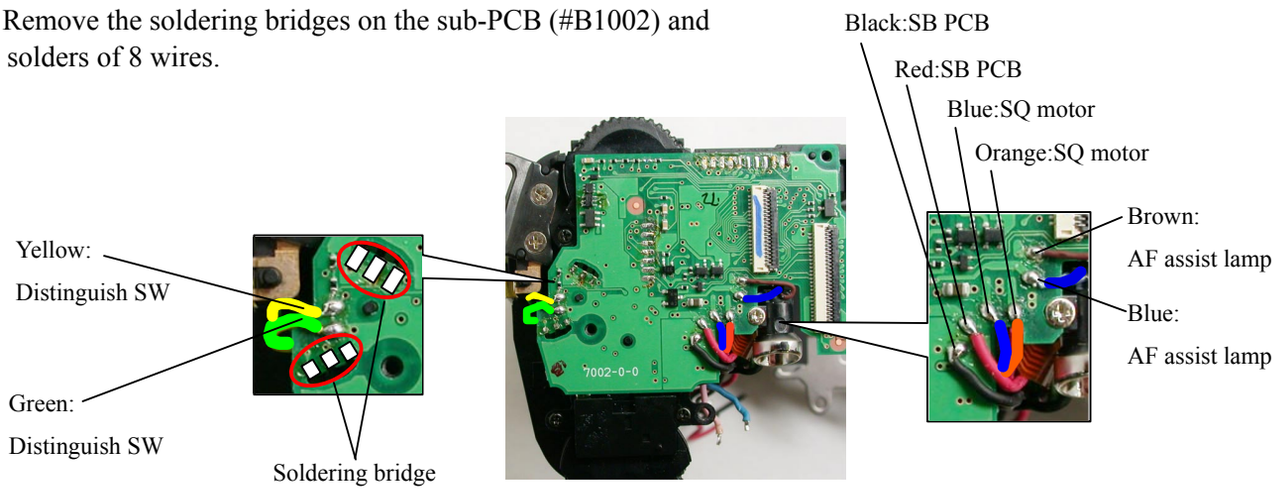
Main-SW FPC

・Remove the soldering bridges on the sub-PCB (#B1002) to detach the main-SW FPC (#B1011).

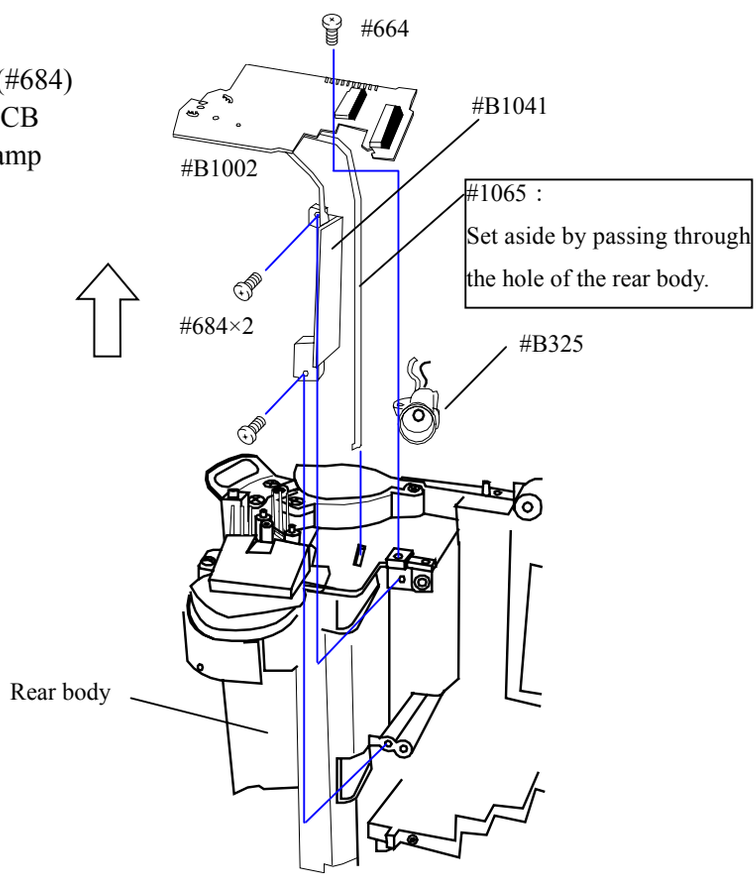


SB-PCB / Sub-PCB

・Remove the soldering bridges on the sub-PCB (#B1002) and solders of 8 wires.

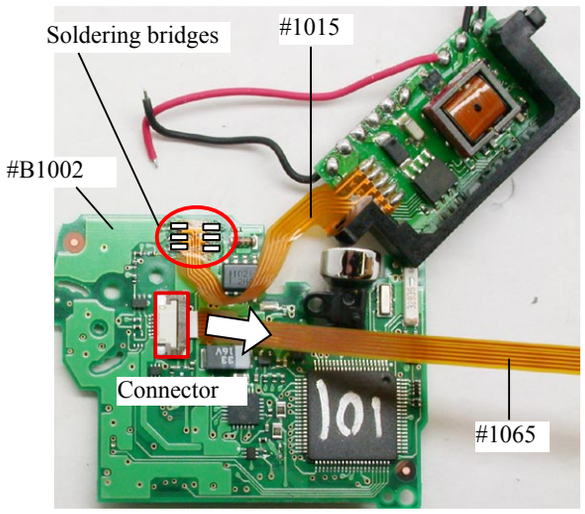


・Take out the screw (#664) and 2 screws (#684) so that the sub-PCB (#B1002) and SB-PCB (#B1041) are detached. The AF assist lamp (#B325) comes off, too.

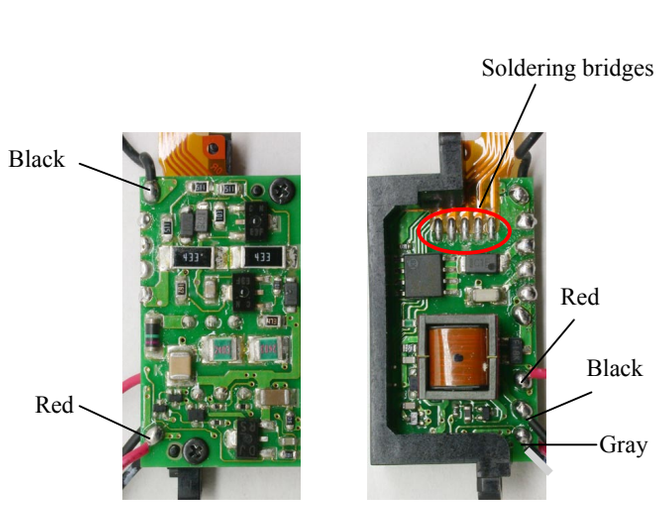


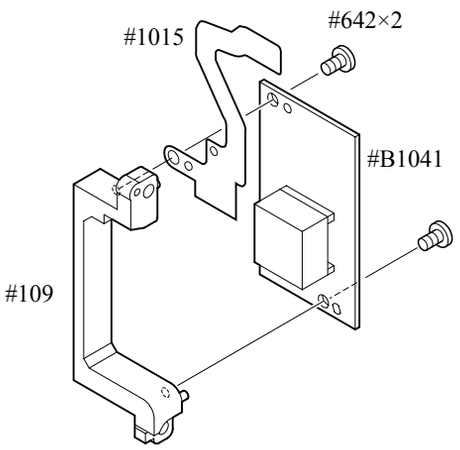
Separate SB-PCB from Sub-PCB

- Remove the soldering bridges of Sub-SB connection FPC (#1015).
- Remove the connection FPC (#1065) from the connector.

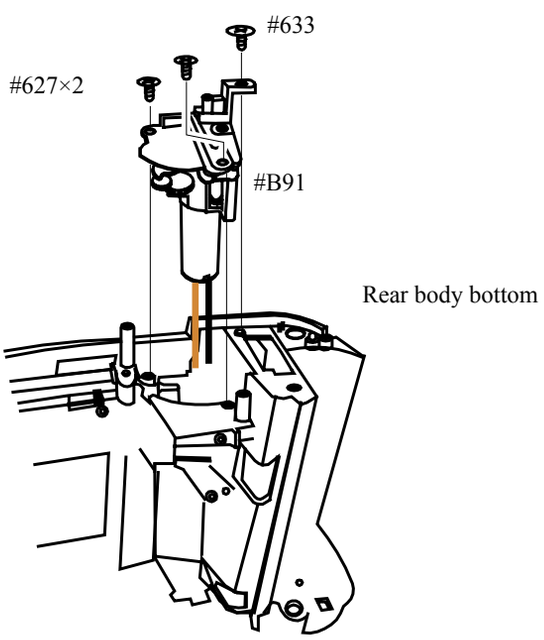


SB PCB

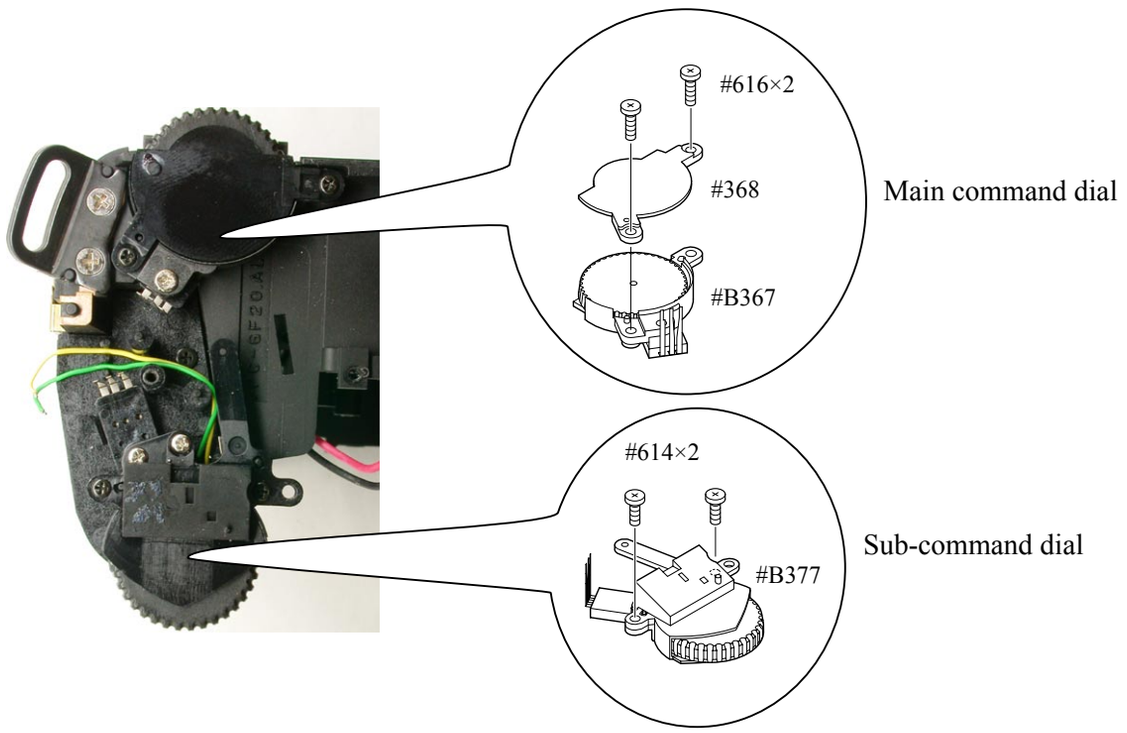




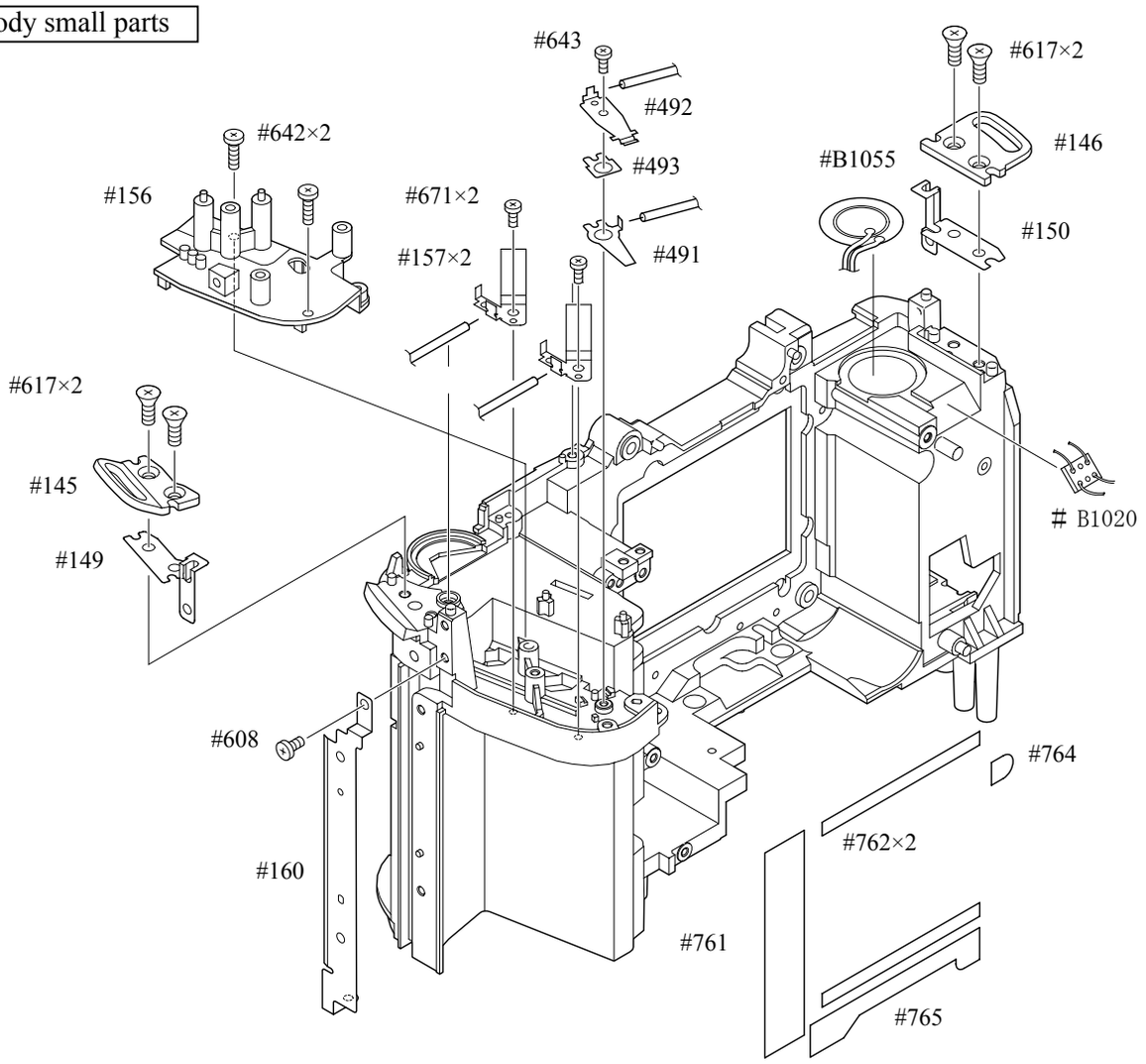
SQ unit



Main-/Sub- command dial unt



Rear body small parts

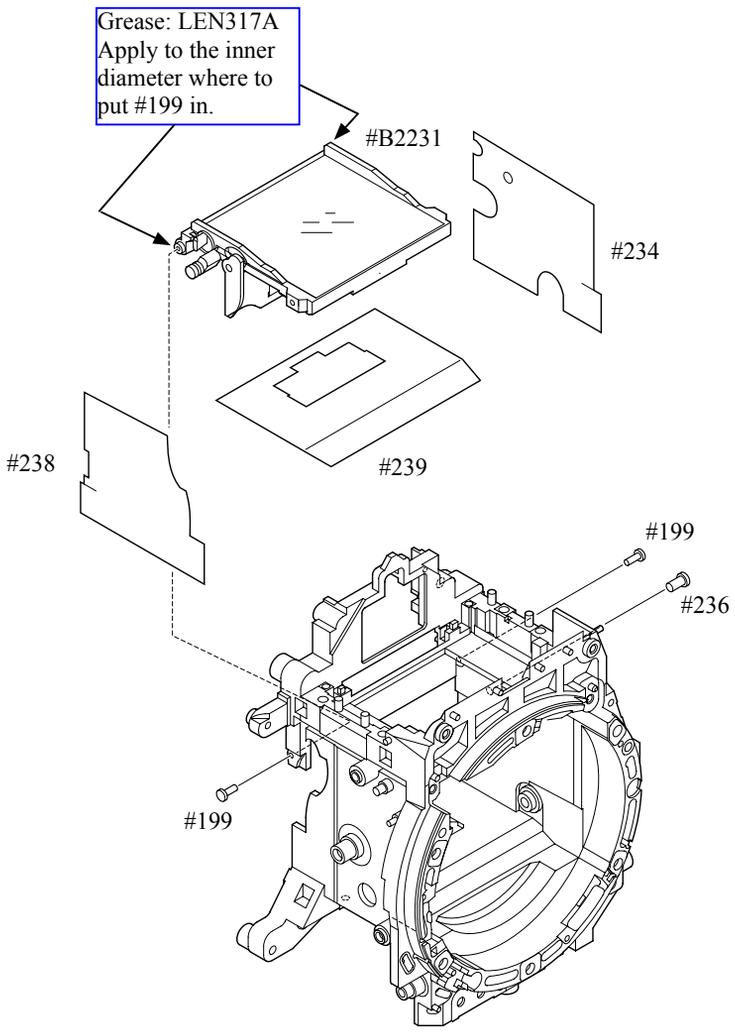


Assembly/Adjustment

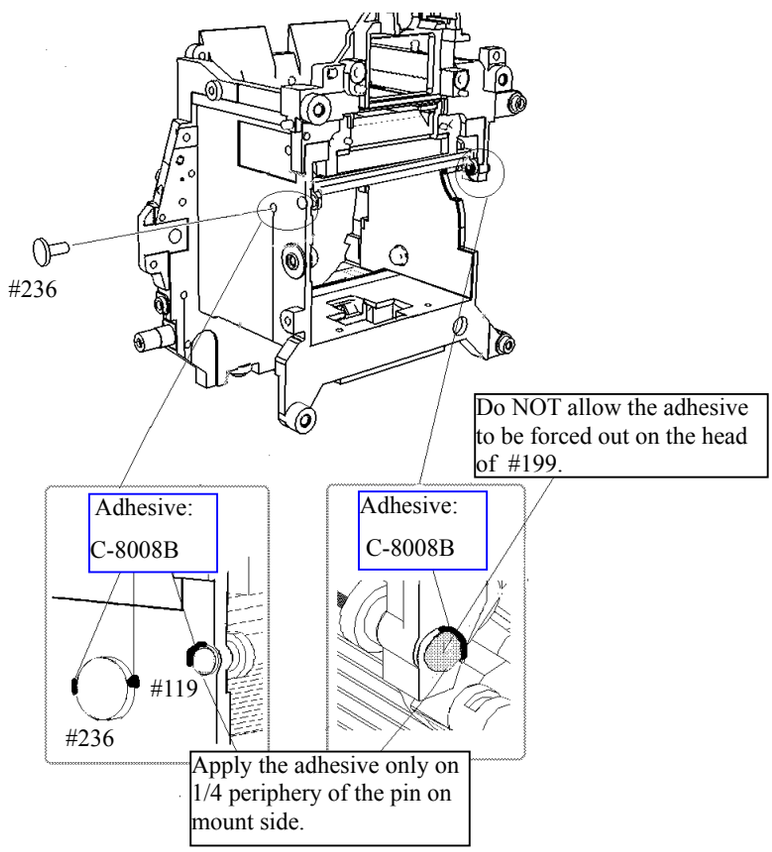
- NOTE: For undescribed tapes and sponges in"Assembly" section, refer to"other tapes/sponges" on page A46-47 and PARTS LIST.

1. Front body

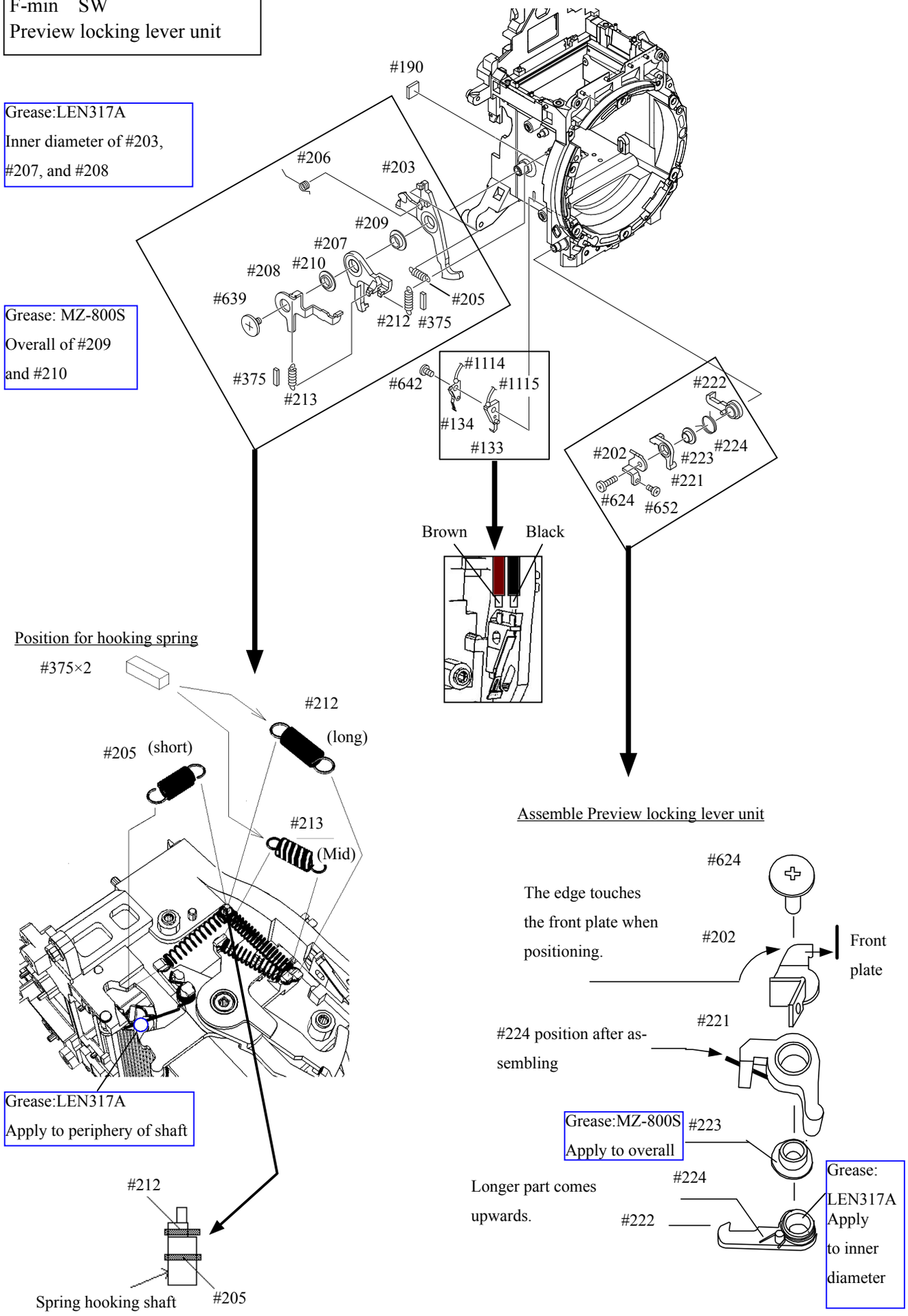
Mirror unit



- With being mirror-up as shown right, assemble the pins and apply C-8008B (Adhesive: Super X) on each pin.



Aperture lever unit
F-min SW
Preview locking lever unit



Aperture control unit

1. Turn the sequence white gear of the aperture control unit in the direction indicated by the arrow, and position the arm as shown in Fig. ① .
2. Place #248 in center of movement of range, and lock it with #249. (ref. Fig. ①)
3. Lock the lever (#203) with #222. (ref. Fig. ②)
4. While holding the aperture lever down with finger, insert the arm between #207 and #203, then take finger off the lever. (ref. Fig. ②)
5. Attach 3 screws (#642). (ref. Fig. ③ and ④)
6. Release the locked lever (#222).

Fig. ①

Aperture control unit

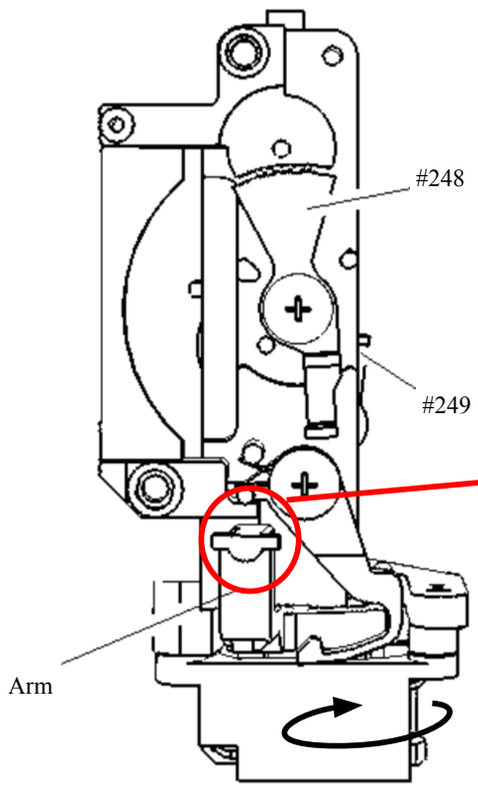


Fig. ②

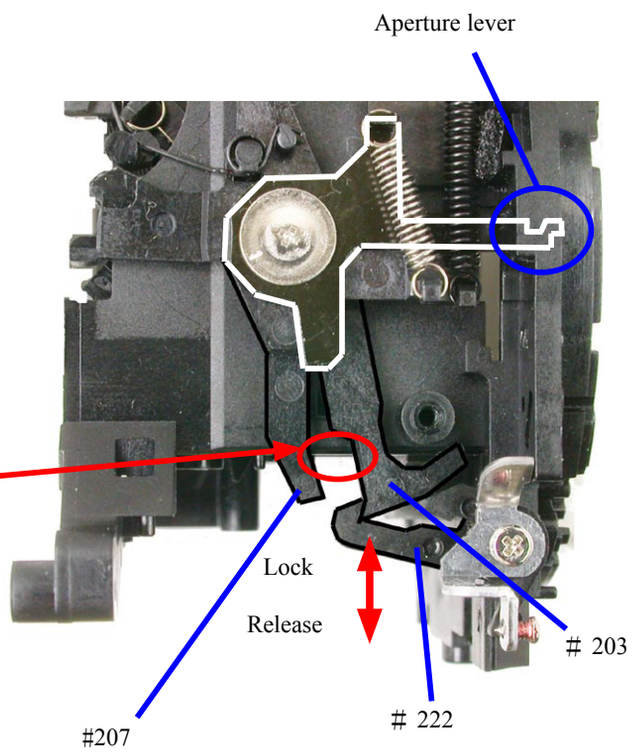


Fig. ③

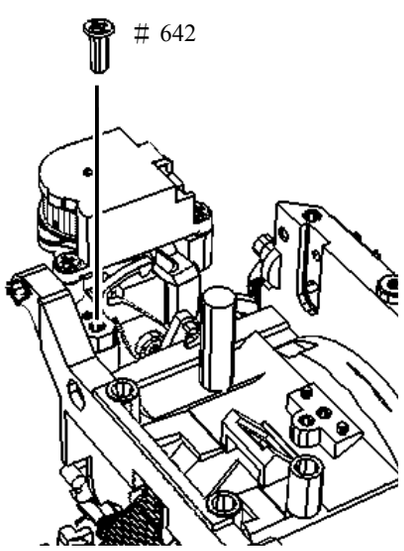
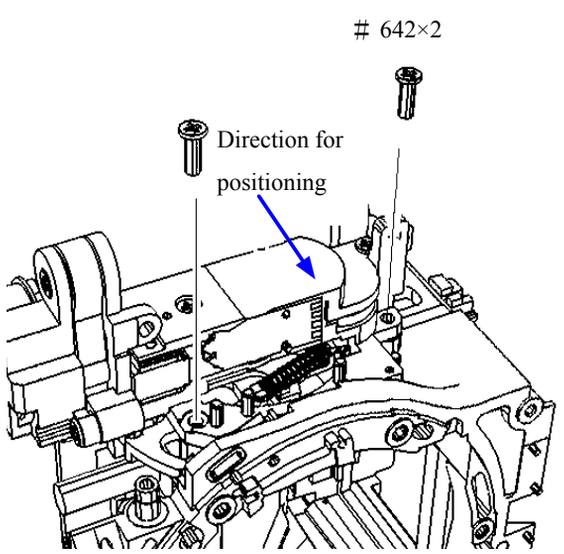


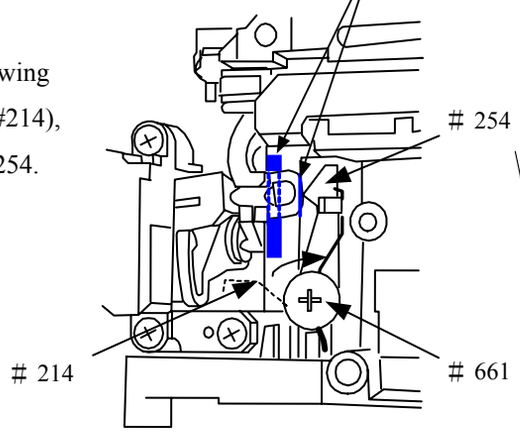
Fig. ④

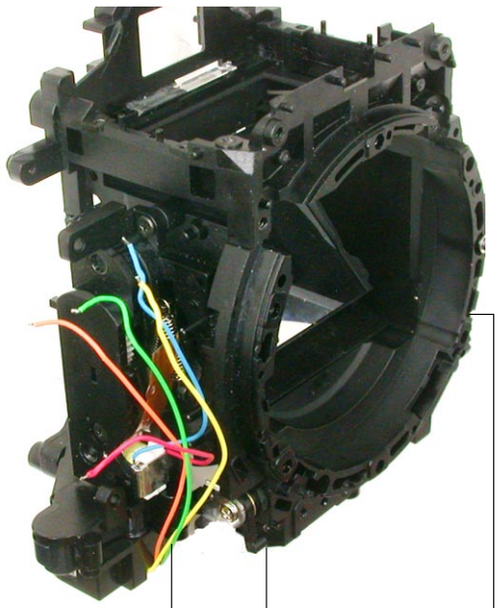


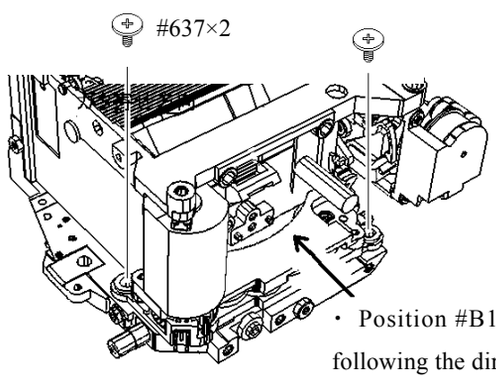
AF driving unit
Preview lever brake

Grease: LEN317A
Apply a little
on sliding surface

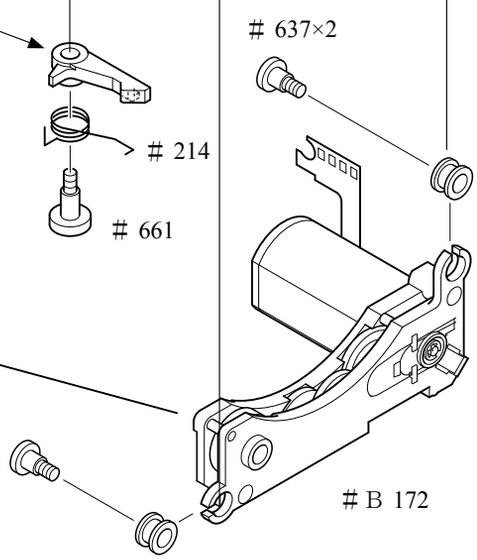
・After screwing the spring (#214), hook it to #254.



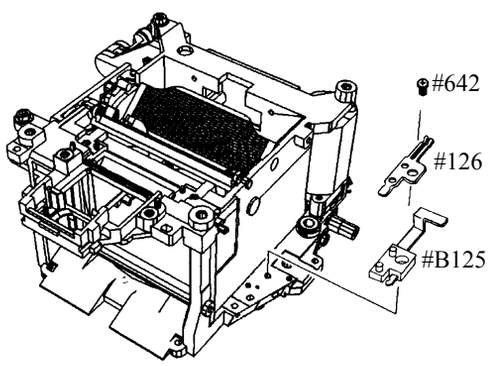


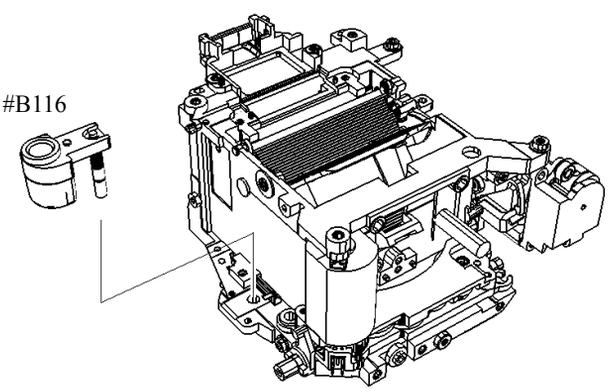


・Position #B172 by following the direction and screw it.



A/M change SW
Lens release button

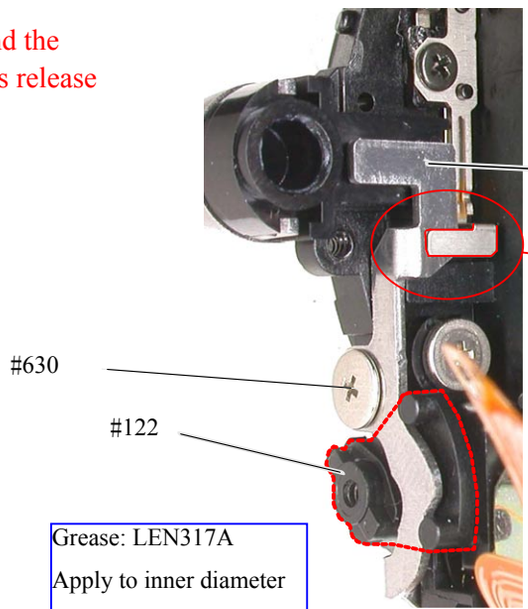




Vertical lever

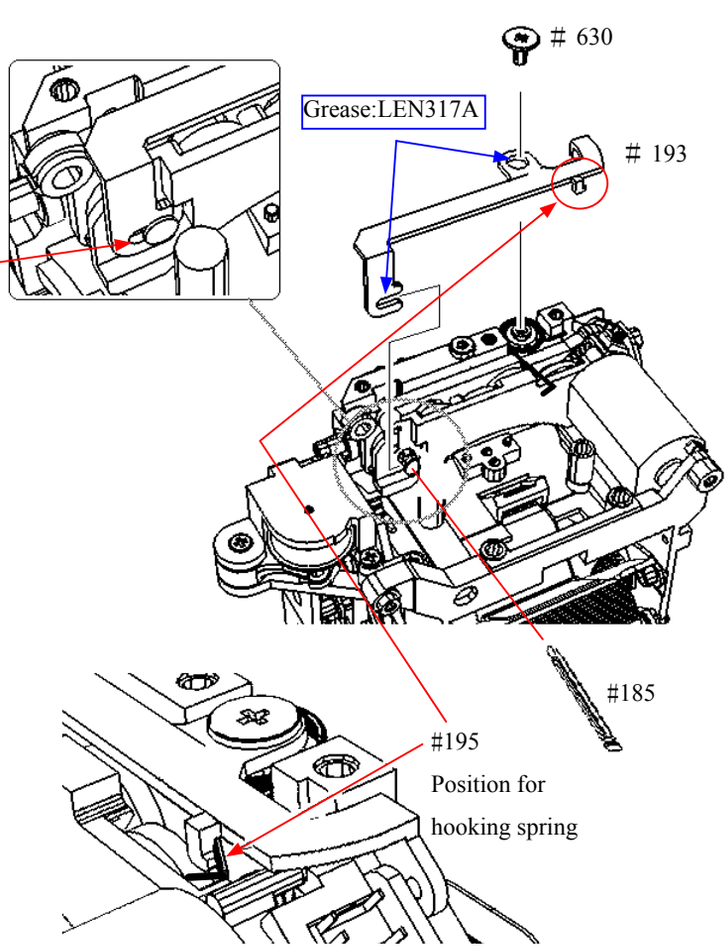
・ Assemble by the following order.
#122→#191→#630

＊ Note: Be careful NOT to bend the contact blade of the lens release SW.

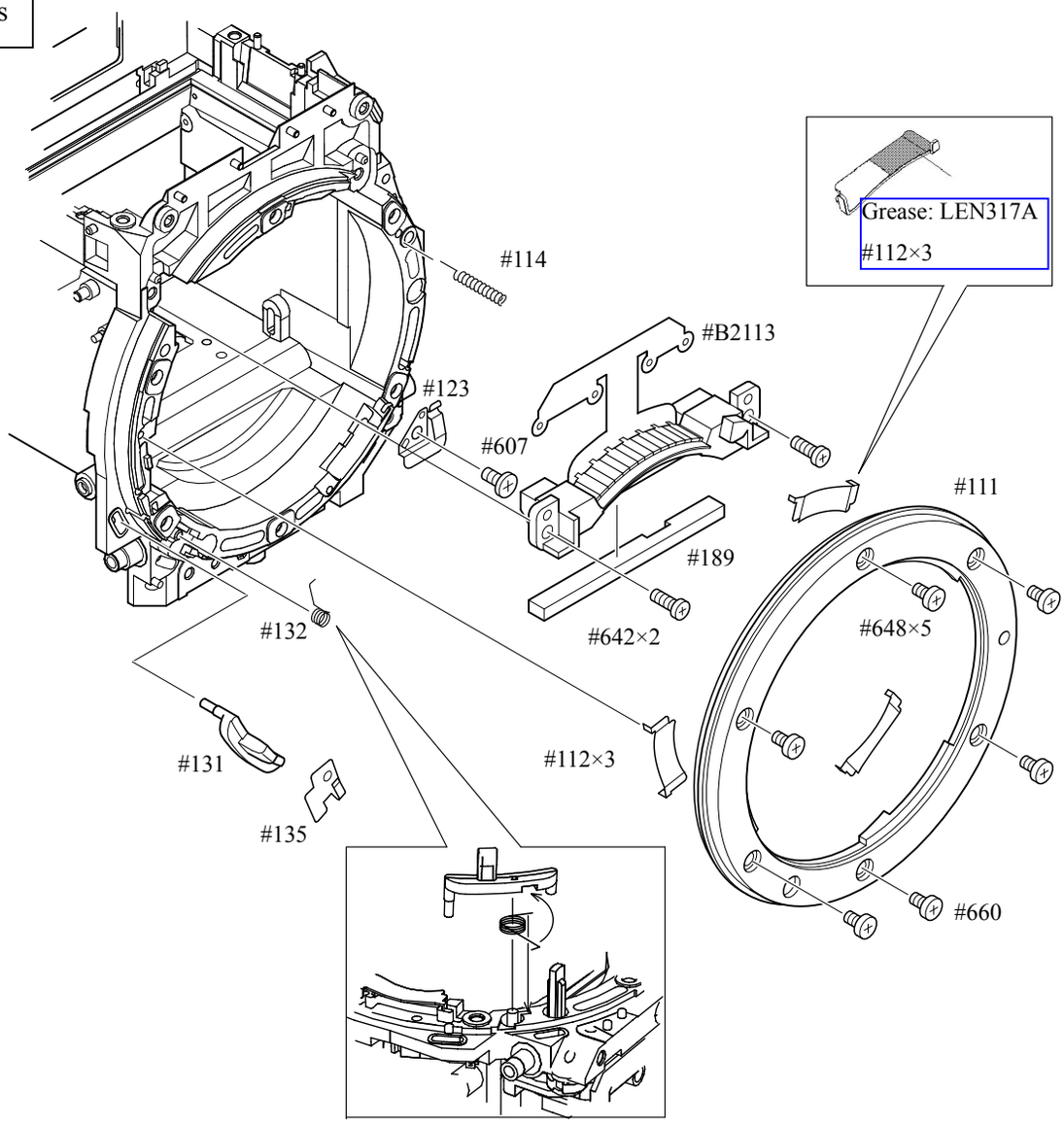


Horizontal lever

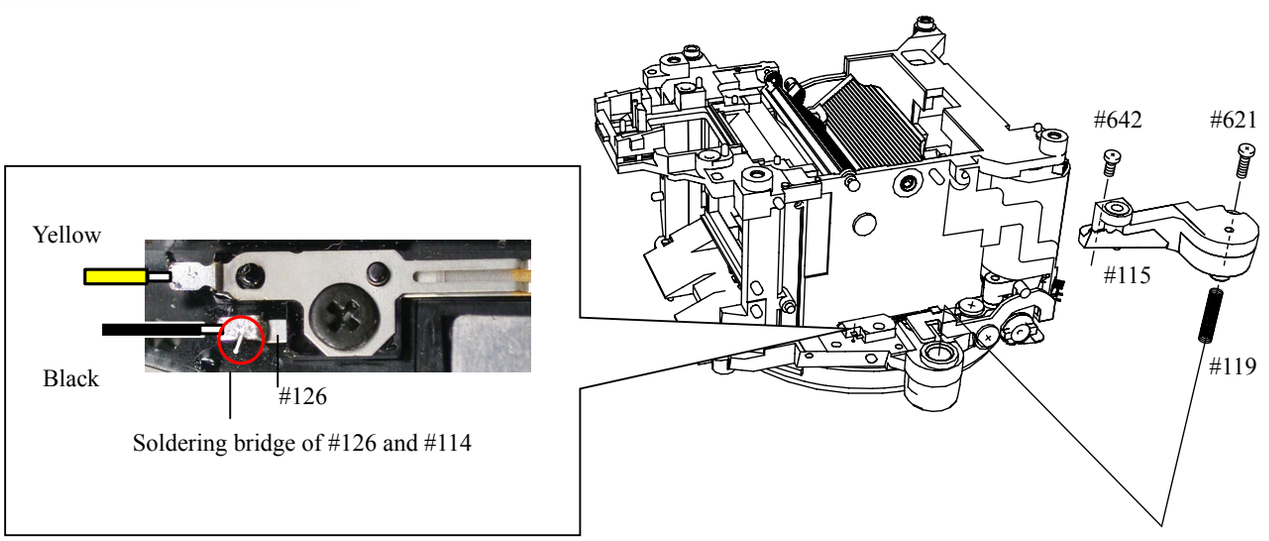
・Insert the U-shaped part of #193 into the groove of the AF driving shaft (#185).



Bayonet unit
AF lens contacts



A/M change SW cover unit

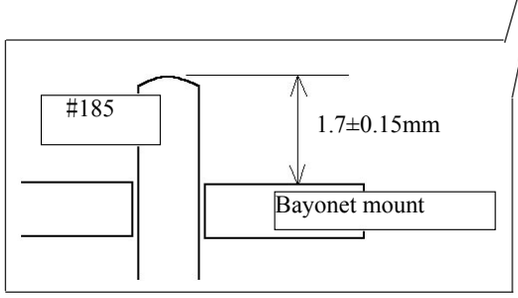


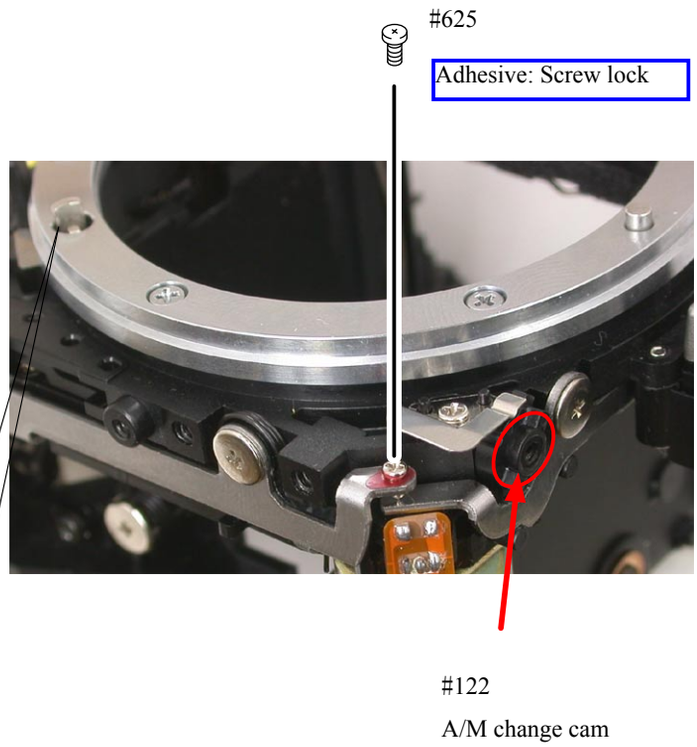
Height adjustment of AF coupling shaft

① Set the A/M change cam (#122) to AF side. (i.e. The AF coupling shaft (#185) sticks out of the bayonet.)

② Adjust the height of the AF coupling shaft (#185) with the screw (#625) so that it becomes 1.7±0.15mm.

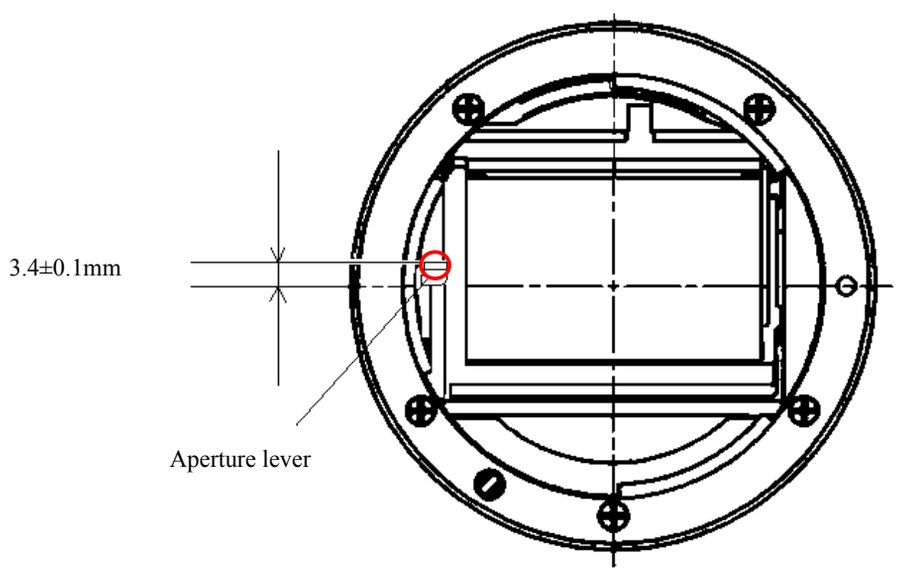
③ After the adjustment, fix the screw (#625) with screw lock.



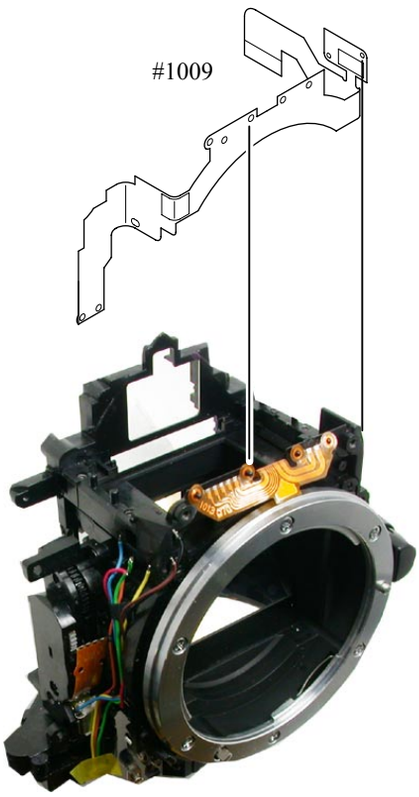


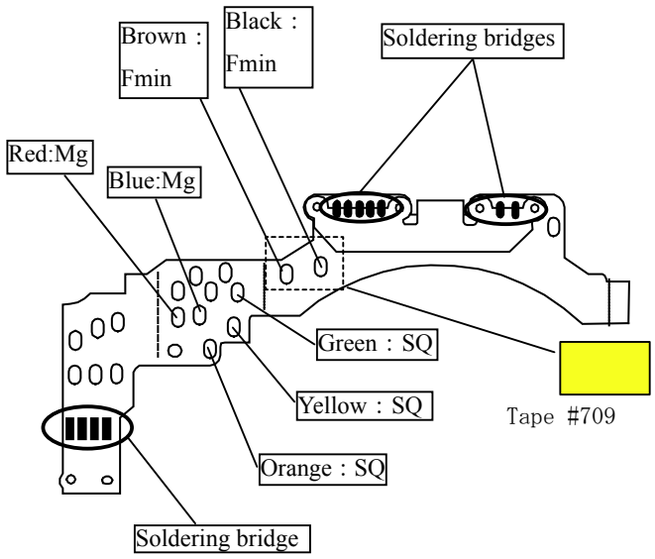
Height adjustment of Aperture lever

・Measure the height of the aperture lever by using the tool (J18004).
Standard: 3.4±0.1mm
In case the value is out of standard, make an adjustment by bending the circled part.
Be careful NOT to bend the inner part of the lever when adjusting!



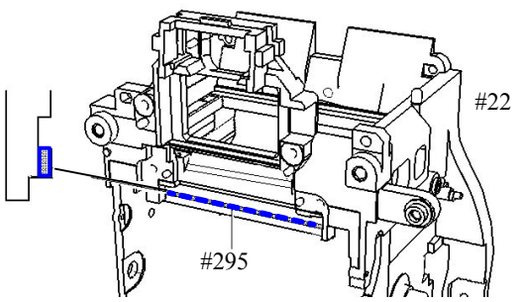
Front body FPC



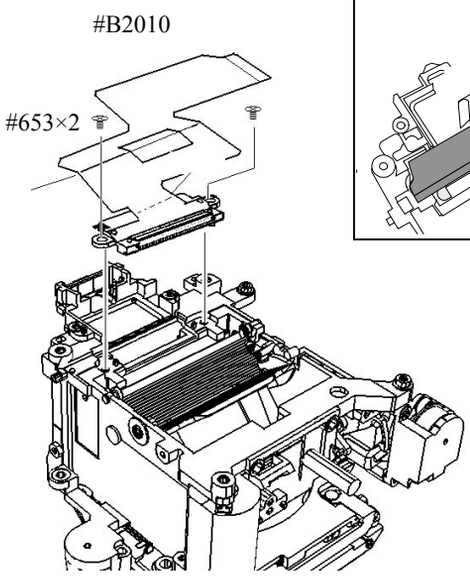


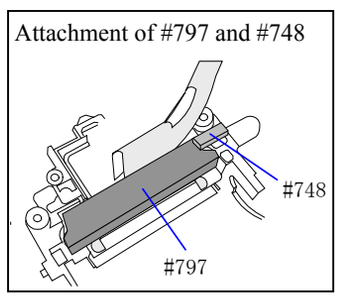
Inner LCD unit

・Attach the sponge (#295) on the front plate (#22).



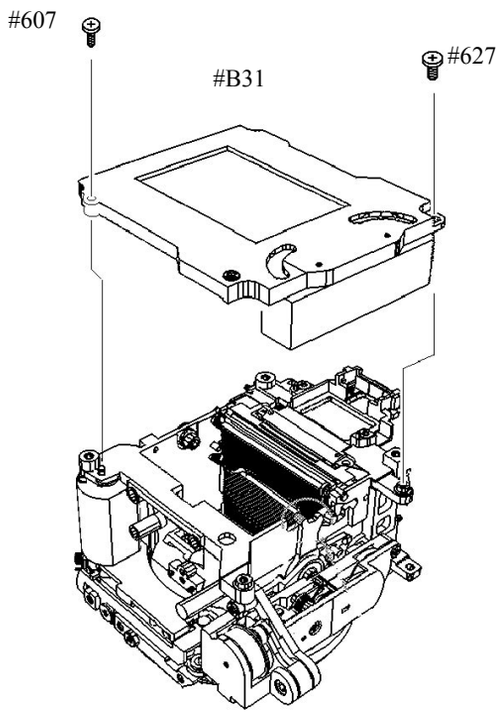
・Attach the inner LCD unit (#B2010) with 2 screws (#653).
・Attach the sponge (#797) and (#748)



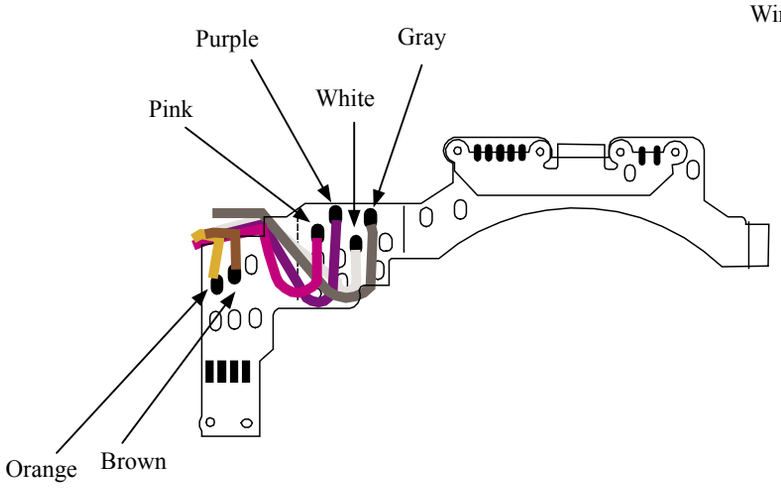


Shutter unit

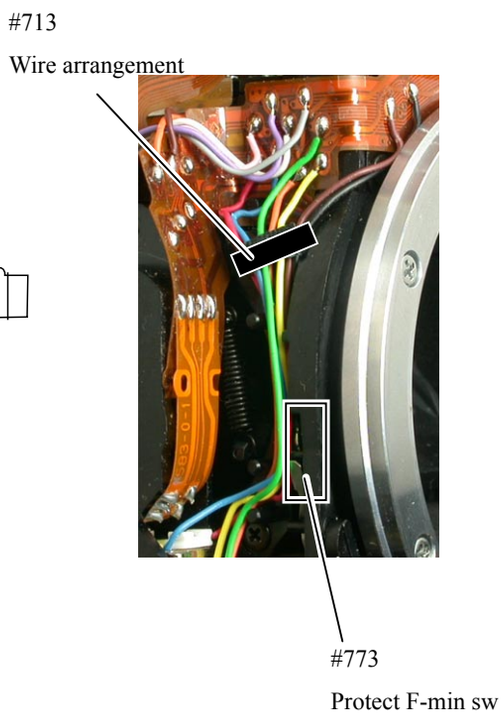
・Attach the shutter unit (#B31) with the screws (#607 and #627).



・Make soldering bridges and solder wires.

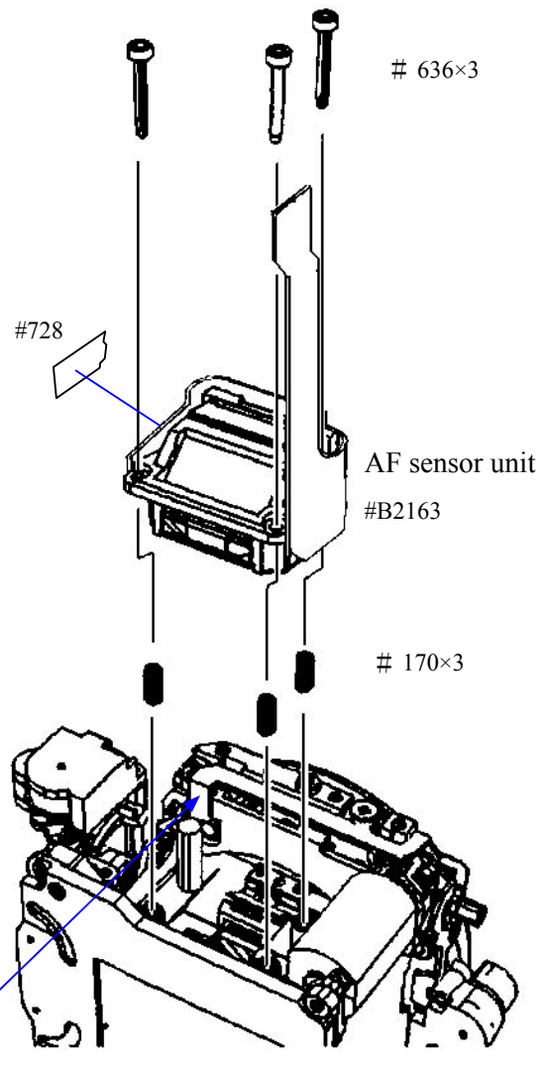


・Make an arrangement of wires and attach 2 pieces of tapes.

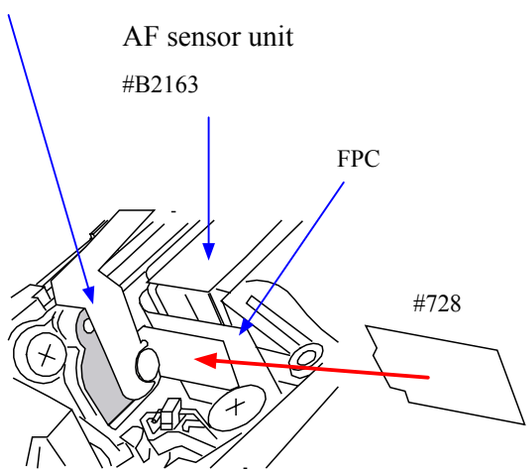


AF sensor unit

・ Attach 3 screws (#636) with Hexagonal wrench to screw up but not tight, then give about 1 turn counterclockwise.



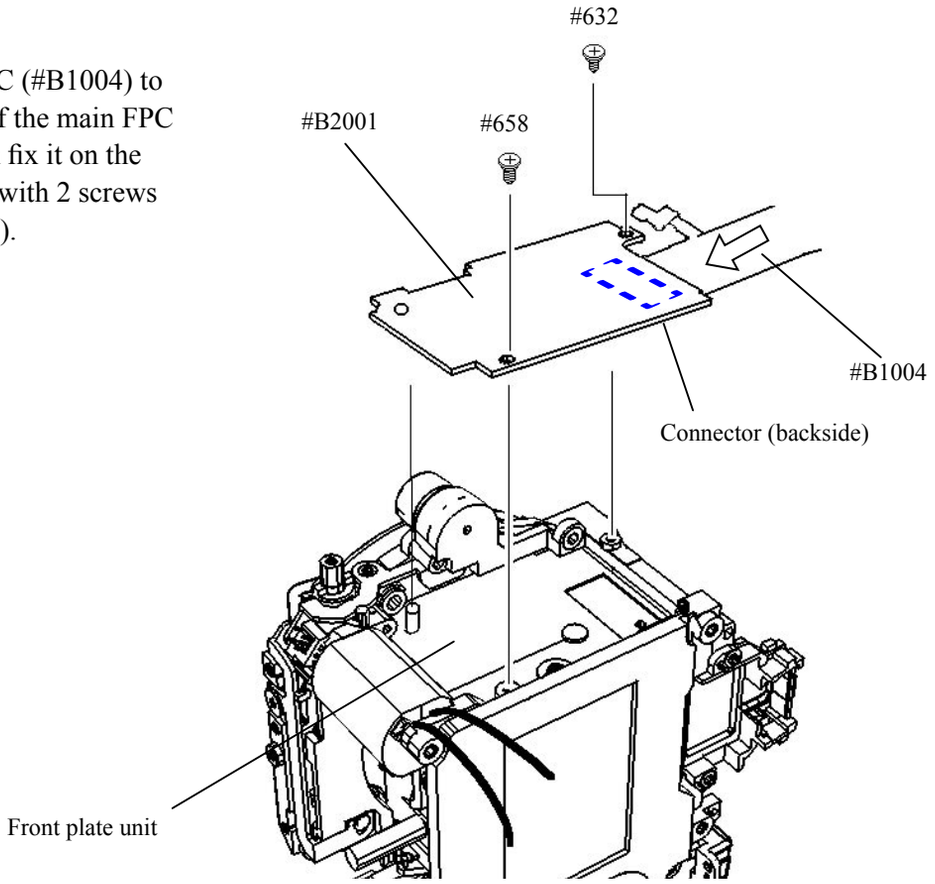
・ Attach #728 so that the FPC of AF sensor unit can be protected.



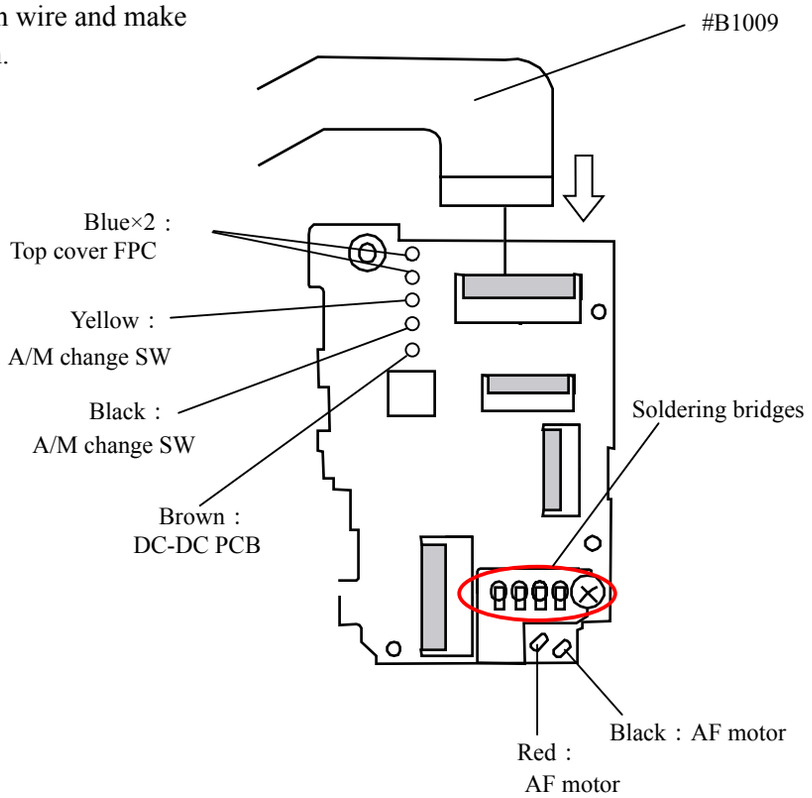
Position for attaching #728

Main PCB

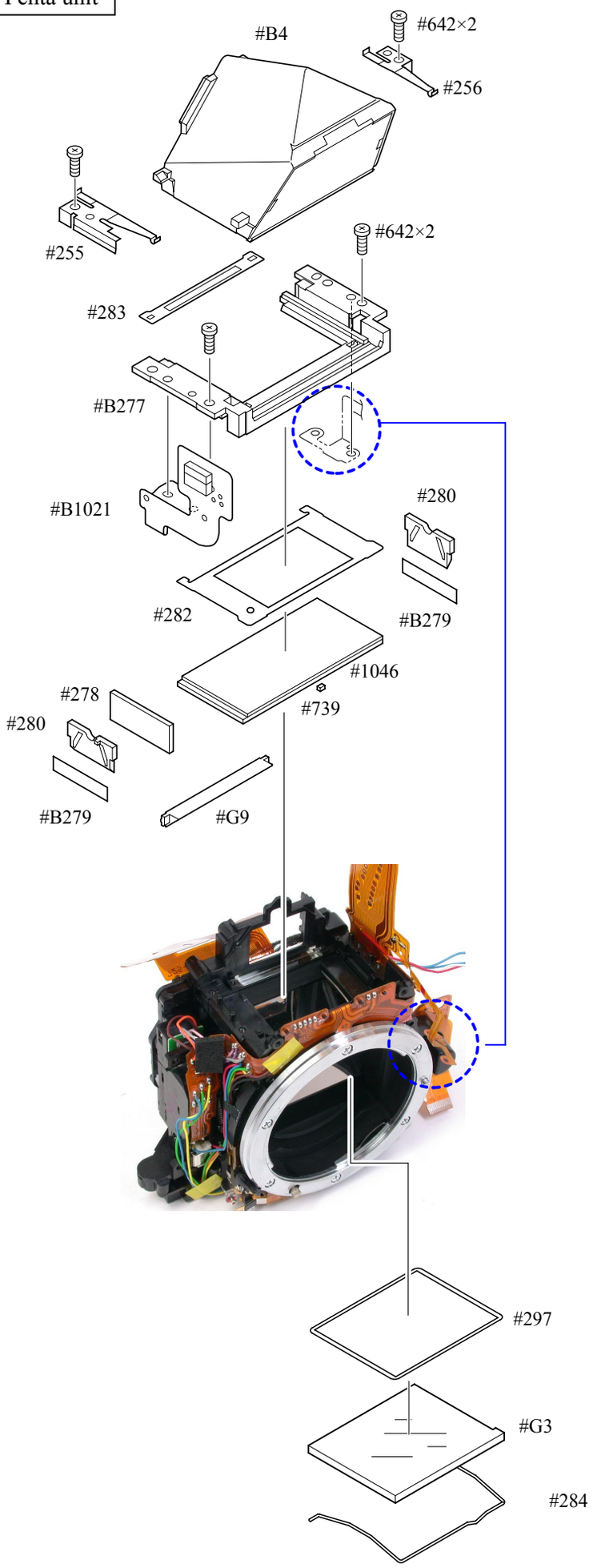
・Connect the FPC (#B1004) to the connector of the main FPC (#B2001), then fix it on the front plate unit with 2 screws (#658 and #632).



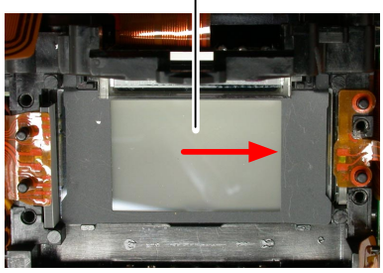
・Connect the front body FPC (#B1009) to the connector. Solder each wire and make solderign bridges for them.

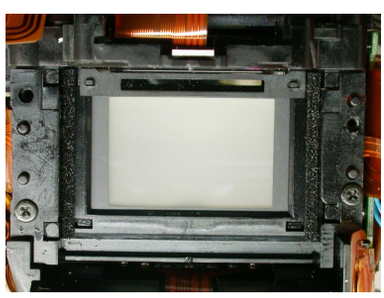


Penta unit

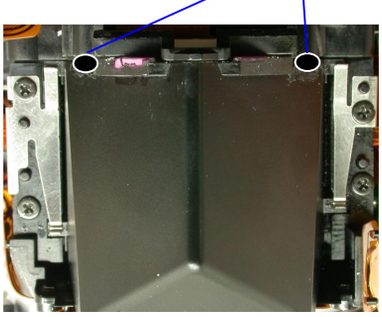


Direction for positioning of SI-LCD #1046





Adhesive: C-8008B

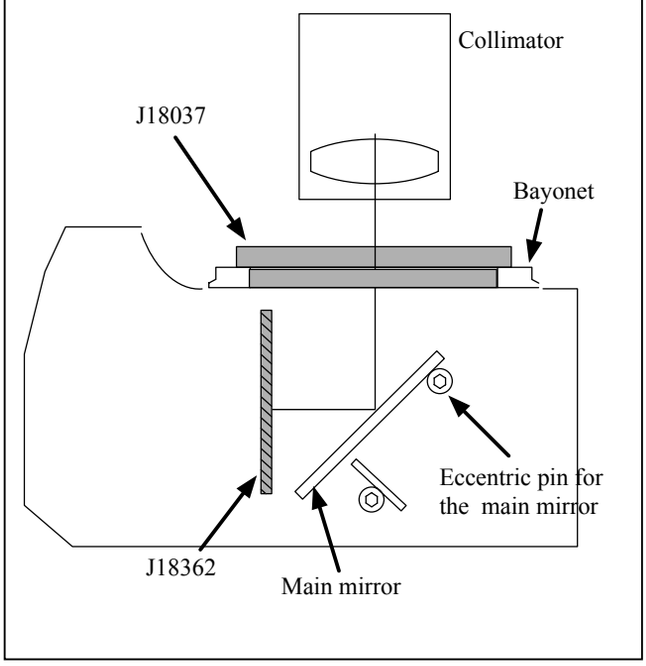


Angle adjustment of Main mirror and sub-mirror

*Tools required:

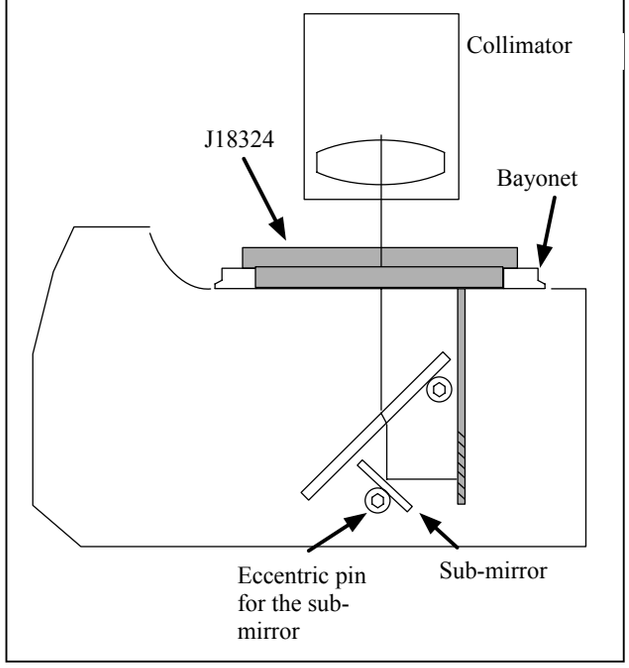
1.Main mirror 45°Inspection and Adjustment

① Collimator (J19002)
② Reflection mirror (J18362)
③ Optical parallel (J18037)
④ Hexagonal wrench



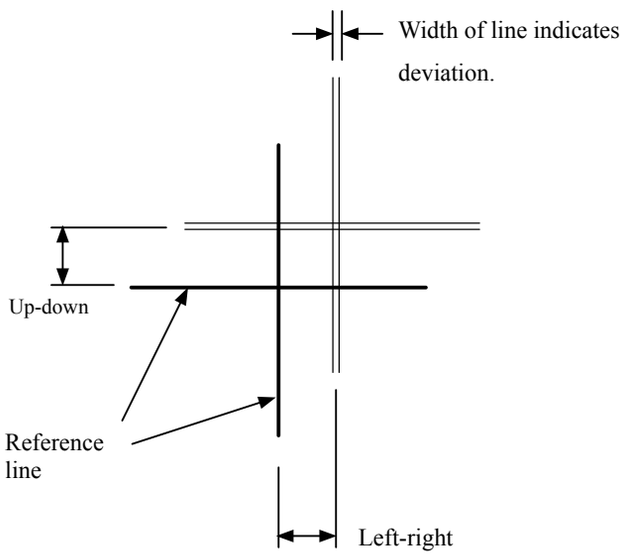
2. Sub-mirror 47.75° Inspection and Adjustment

① Collimator (J19002)
② Sub-Mirror 45 deg. inspection tool (J18324)
③ Hexagonal wrench



* Standard:

	Main mirror	Sub-mirror
Left-right deviation	±30’ or less	――
Up-down deviation	±10’	+15’ ～ -50'
Distortion	8’or less	8’or less

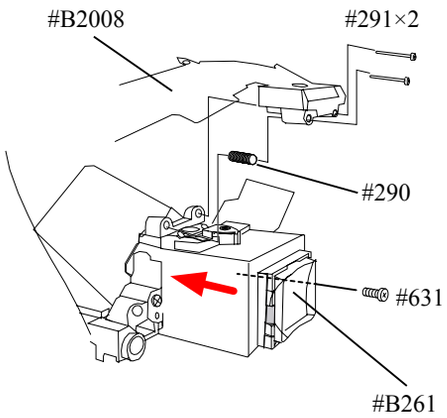


* Note:

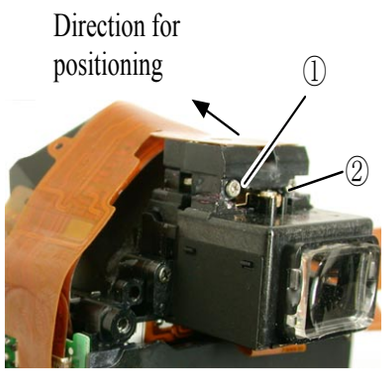
- Before and after the adjustment, check the accuracy by moving the main mirror up- and downwards a few times.
- Check for the up-down deviation. In case the deviation is out of standard, make an adjustment by turning the eccentric pin with Hexagonal wrench.
- In case the deviations of up-down and left-right are out of standard, the front plate unit or mirror unit is regarded as malfunctioning.
- In case check or adjust only front body, check again after attach the front body to the rear body.

Eyepiece unit
Metering FPC unit

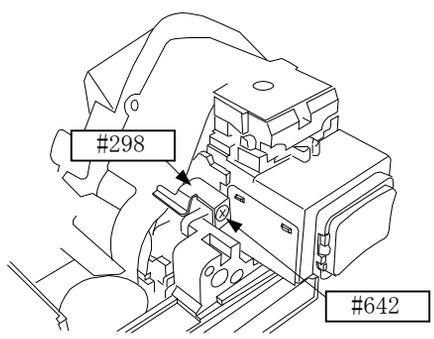
・Attach the eyepiece unit (#B261) with the screw (#631).
Attach the metering FPC unit (#B2008) and the spring (#290) temporarily with 2 screws (#291).



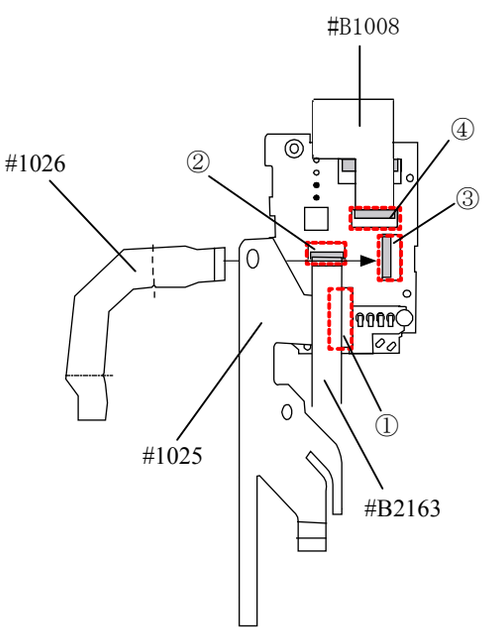
・Position the metering FPC unit by following the direction, then attach it lightly with screws (first ① , then ②).
Give the screws (① and ②) about 3.5 turns counterclockwise.

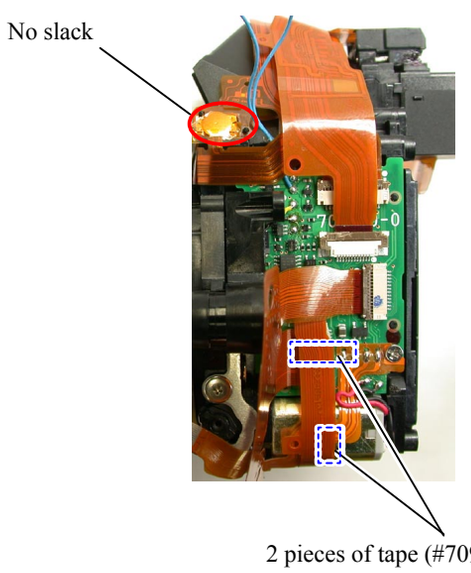


・Attach the plate (#298) with the screw (#642).



FPC connections

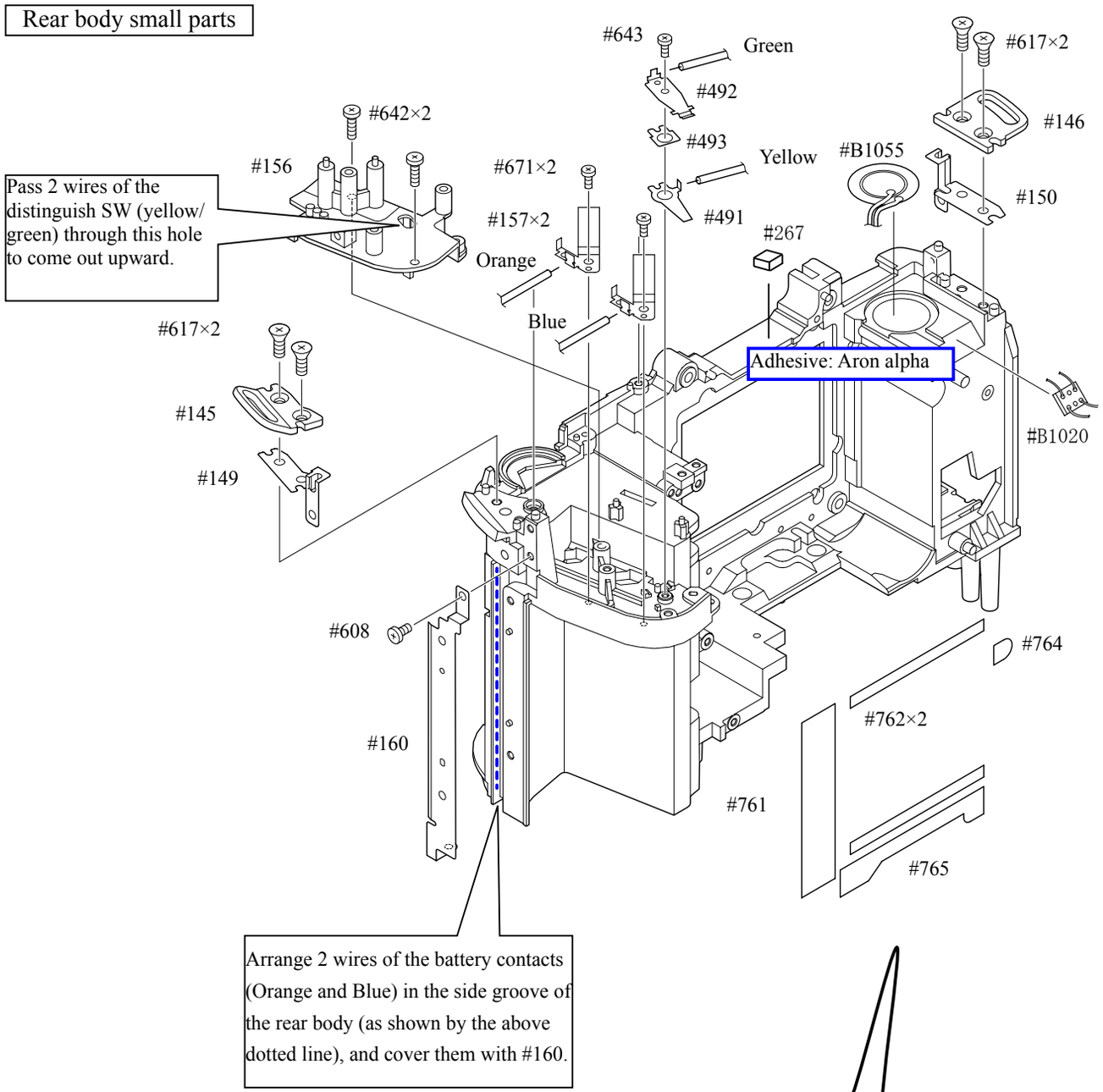


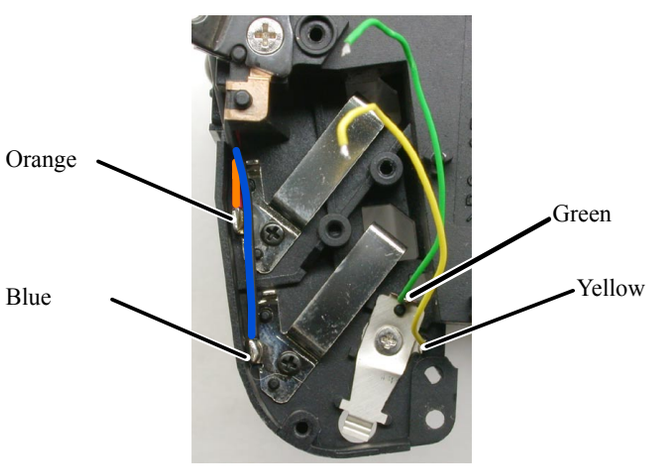


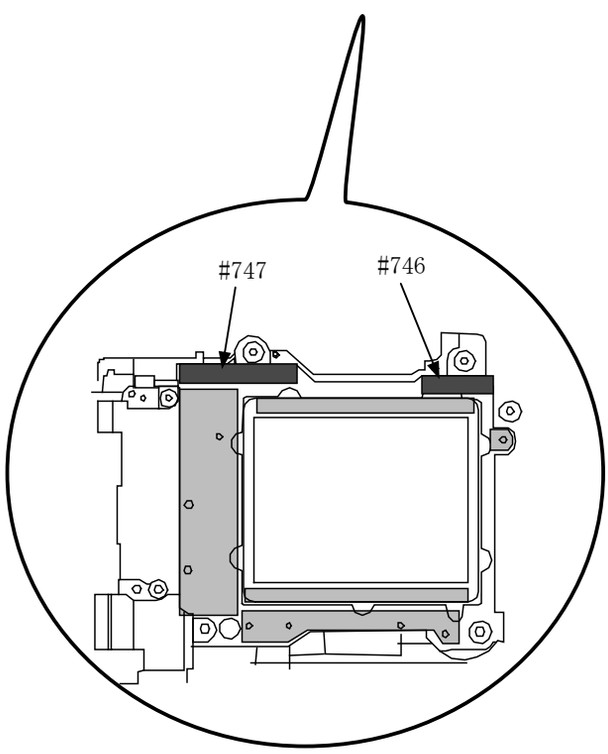
Note: Slack here catches the rear body when it is attached.

2. Rear body

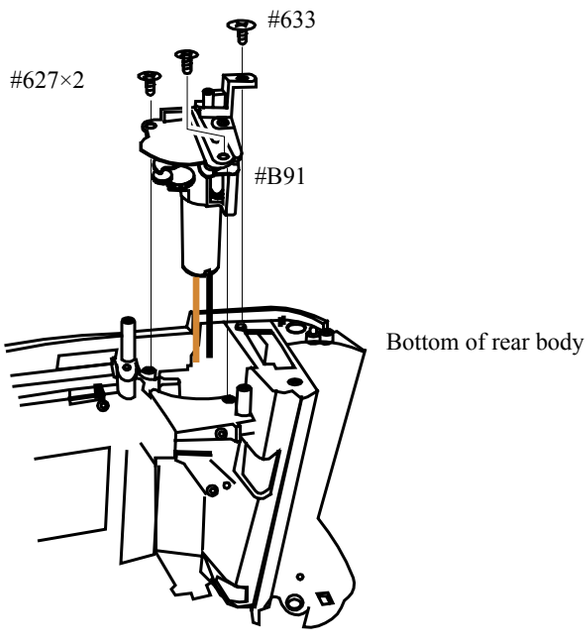
Rear body small parts





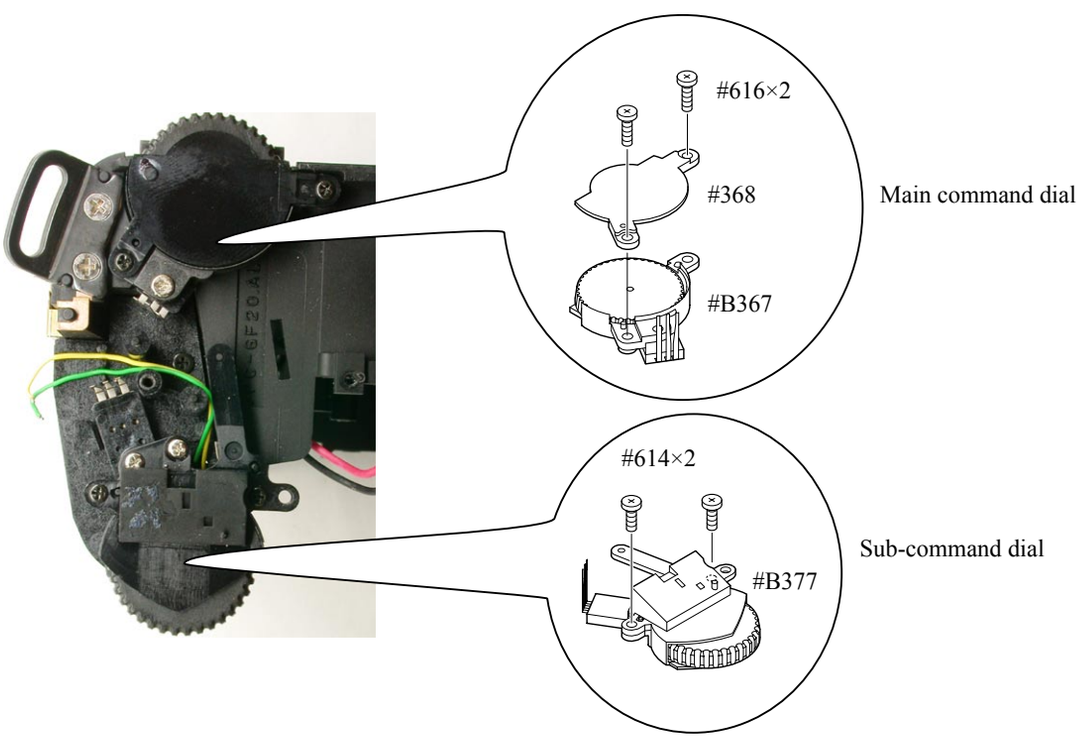


SQ unit



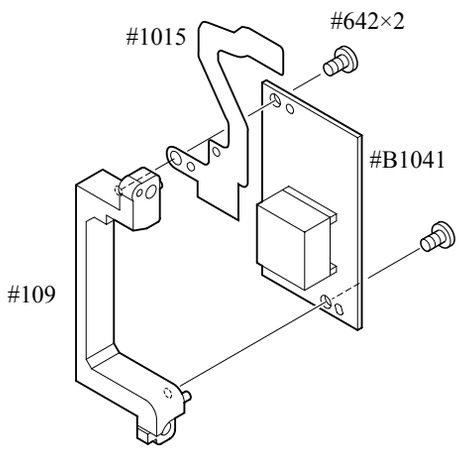
Main-/Sub- Command Dial unit

・Arrange 2 wires of the distinguish SW (yellow and green) as follows.

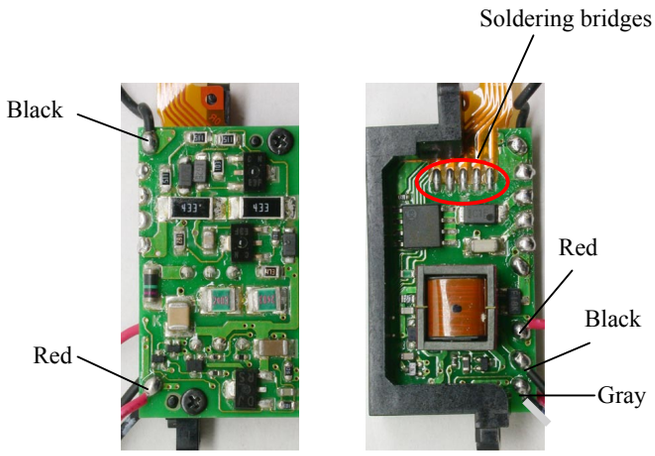


SB PCB / Sub-PCB

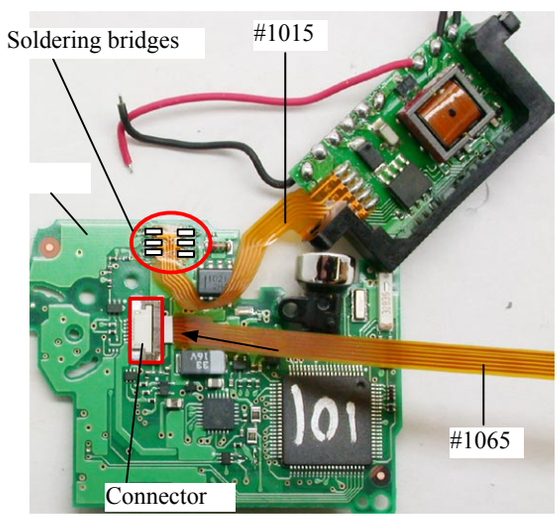
・Assemble the SB PCB (#B1041), sub-SB connection FPC (#1015), and SB-PCB holder (#109) with 2 screws (#642).



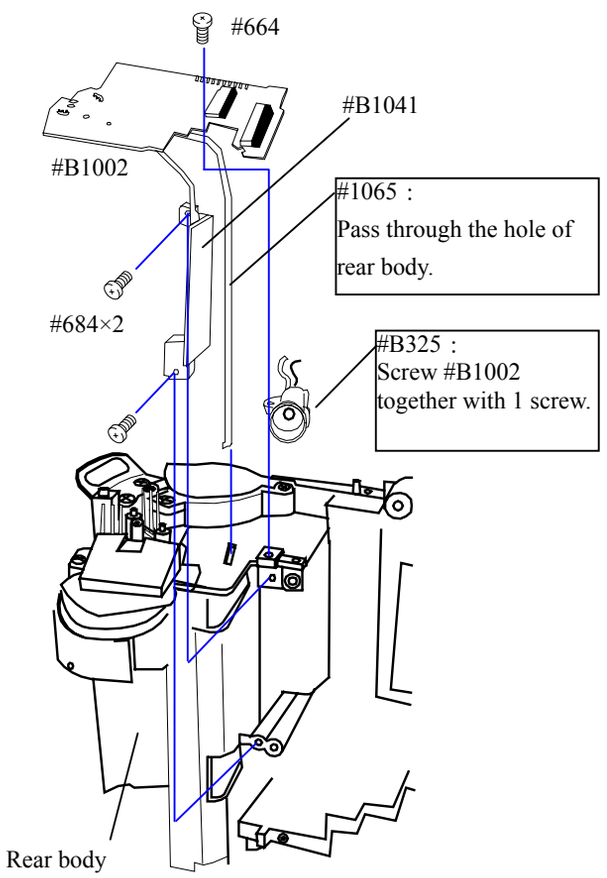
・Make soldering bridges and solder 5 wires.



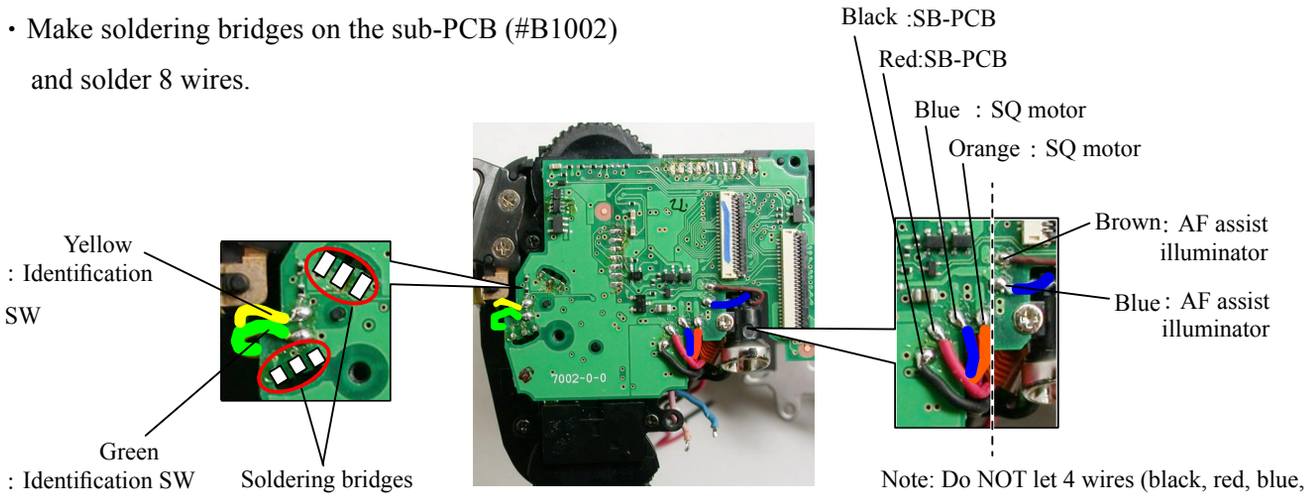
・Connect the connection FPC (#1065) to the connector of the sub-PCB (#B1002). Make soldering bridges of the sub-SB connection FPC (#1015).



・Assemble the sub-PCB (#B1002) and the SB-PCB (#B1041) with 2 screws (#664 and #684) into the rear body.



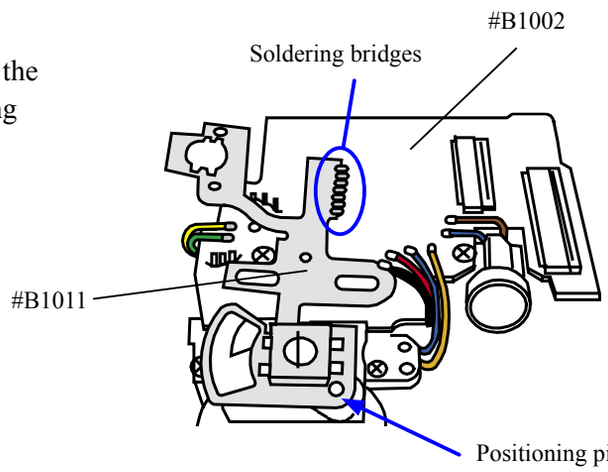
・Make soldering bridges on the sub-PCB (#B1002) and solder 8 wires.



Note: Do NOT let 4 wires (black, red, blue, and orange) be on the right side of the dotted line by exceeding it.

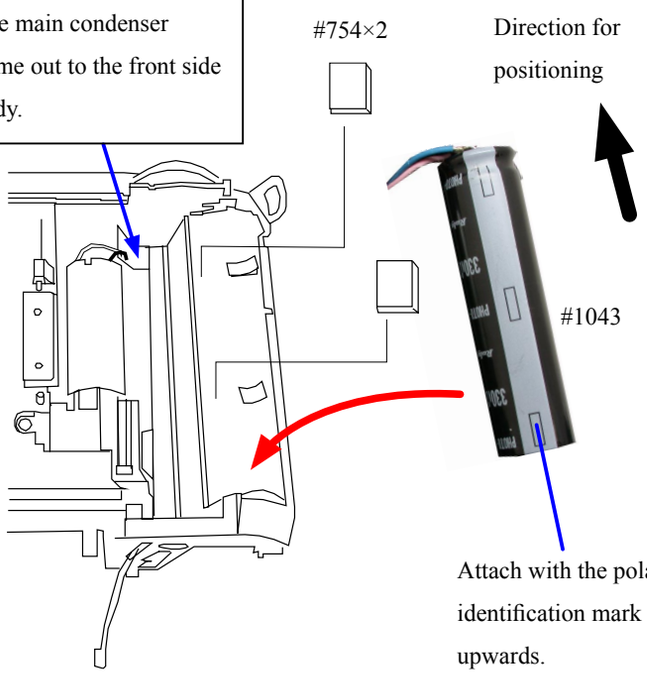
Main SW FPC

・Attach the main SW FPC (#B1011) on the sub-PCB (#B1002), and make soldering bridges of them.

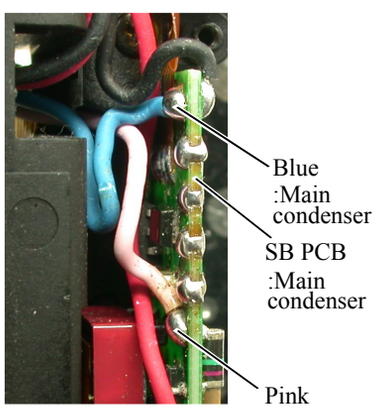


Main condenser

Pass 2 wires (pink and blue) through this hole of the main condenser (#1043) to come out to the front side of the rear body.

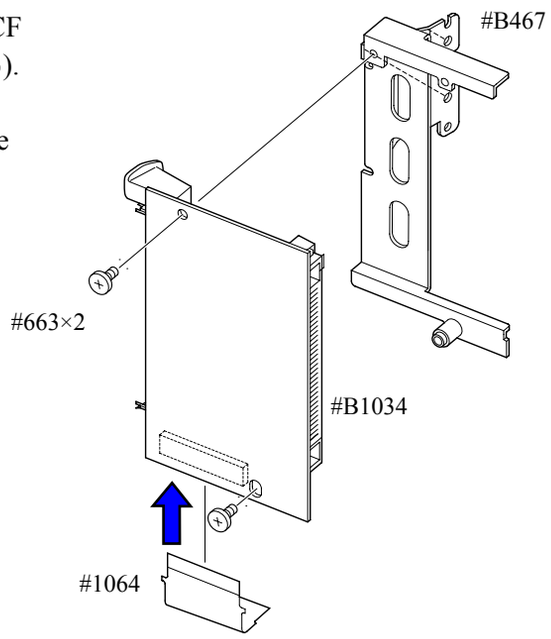


Solder 2 wires (pink and blue) on the front SB PCB of the rear body.

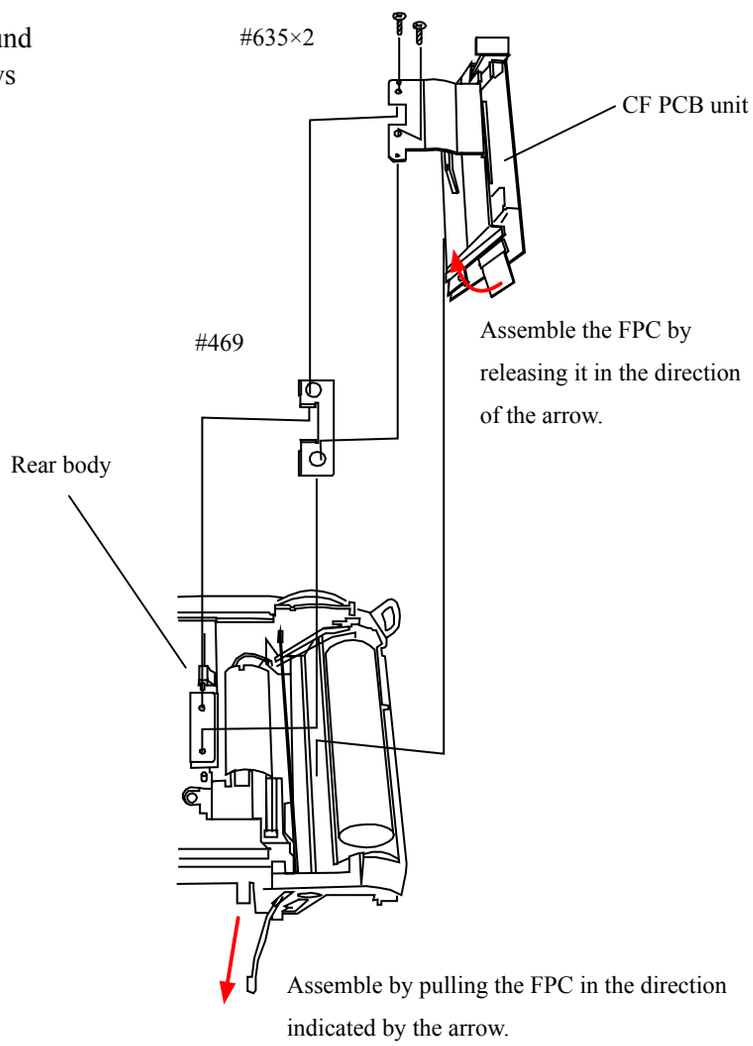


CF PCB unit

- Attach the CF PCB unit (#B1034) on the CF PCB retainer (#B467) with 2 screws (#663).
- Connect the connection FPC (#1064) to the connector of #B1034.

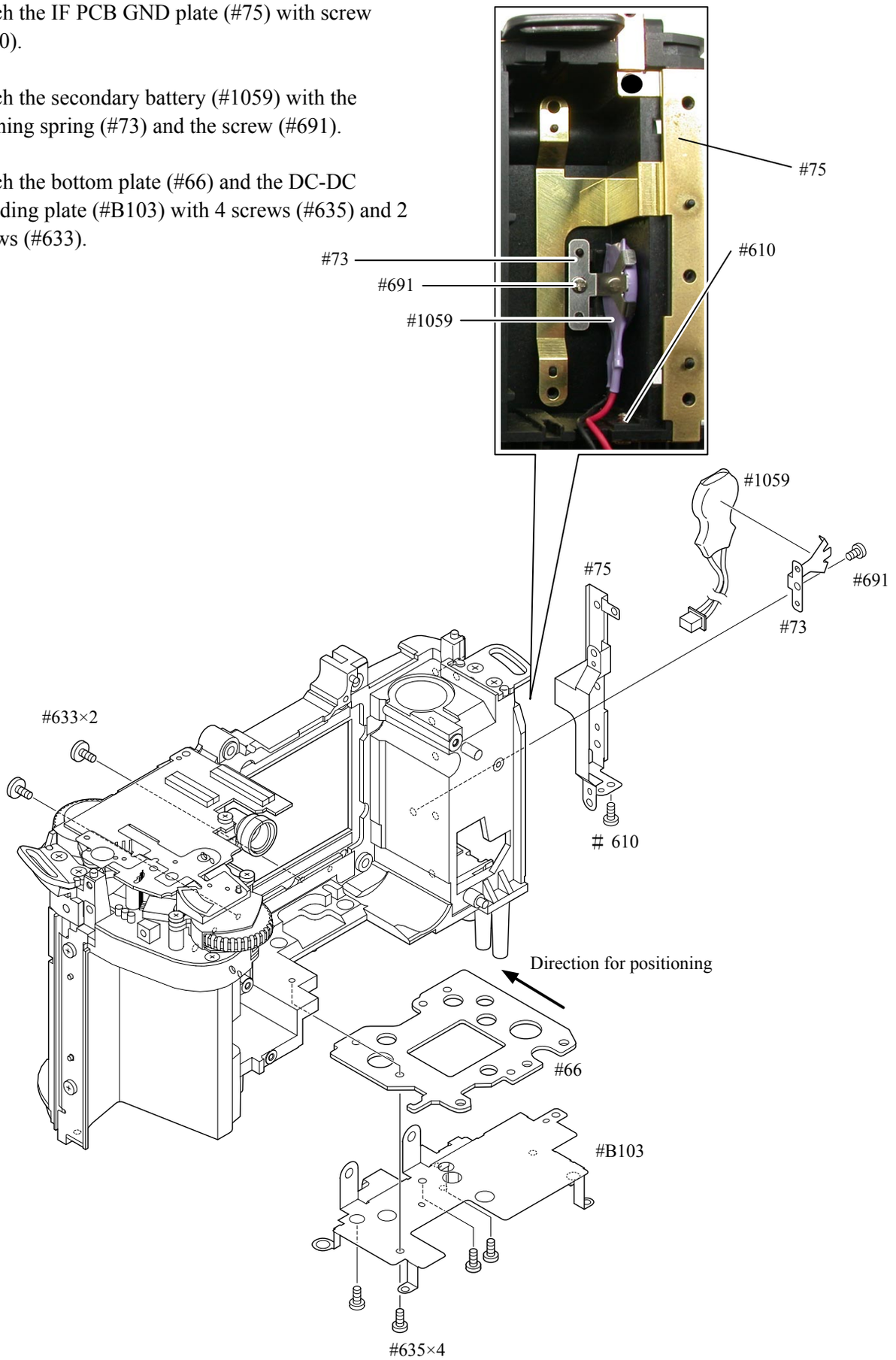


- Assemble the CF PCB unit and CF ground plate (#469) into rear body with 2 screws (#635).


#635×2
CF PCB unit
Assemble the FPC by releasing it in the direction of the arrow.
#469
Rear body
Assemble by pulling the FPC in the direction indicated by the arrow.

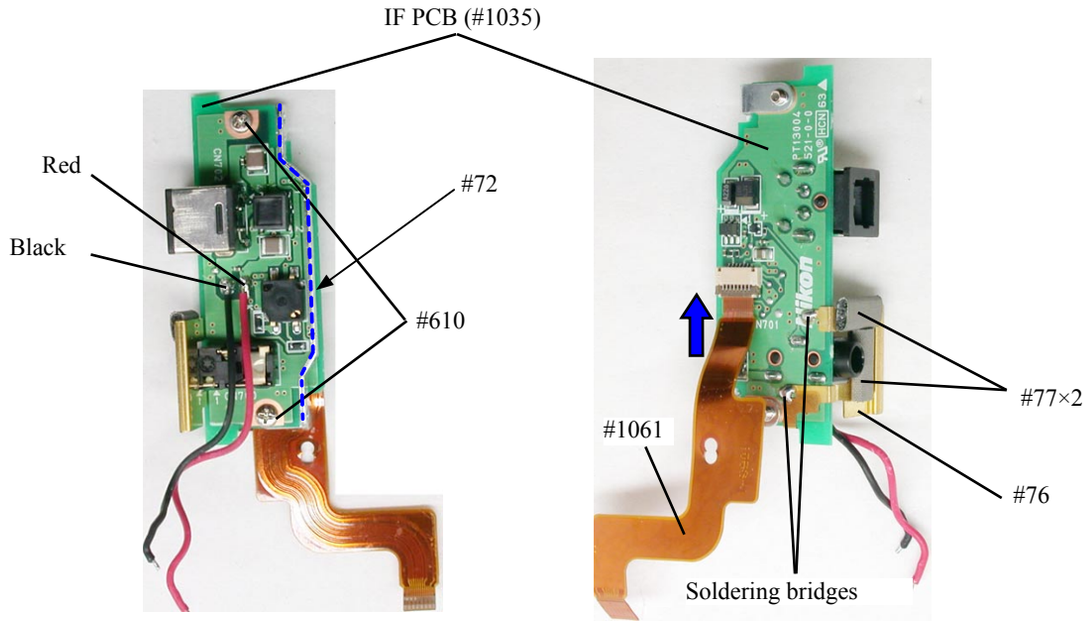
Bottom base plate
Secondly battery

- Attach the IF PCB GND plate (#75) with screw (#610).
- Attach the secondary battery (#1059) with the retaining spring (#73) and the screw (#691).
- Attach the bottom plate (#66) and the DC-DC shielding plate (#B103) with 4 screws (#635) and 2 screws (#633).

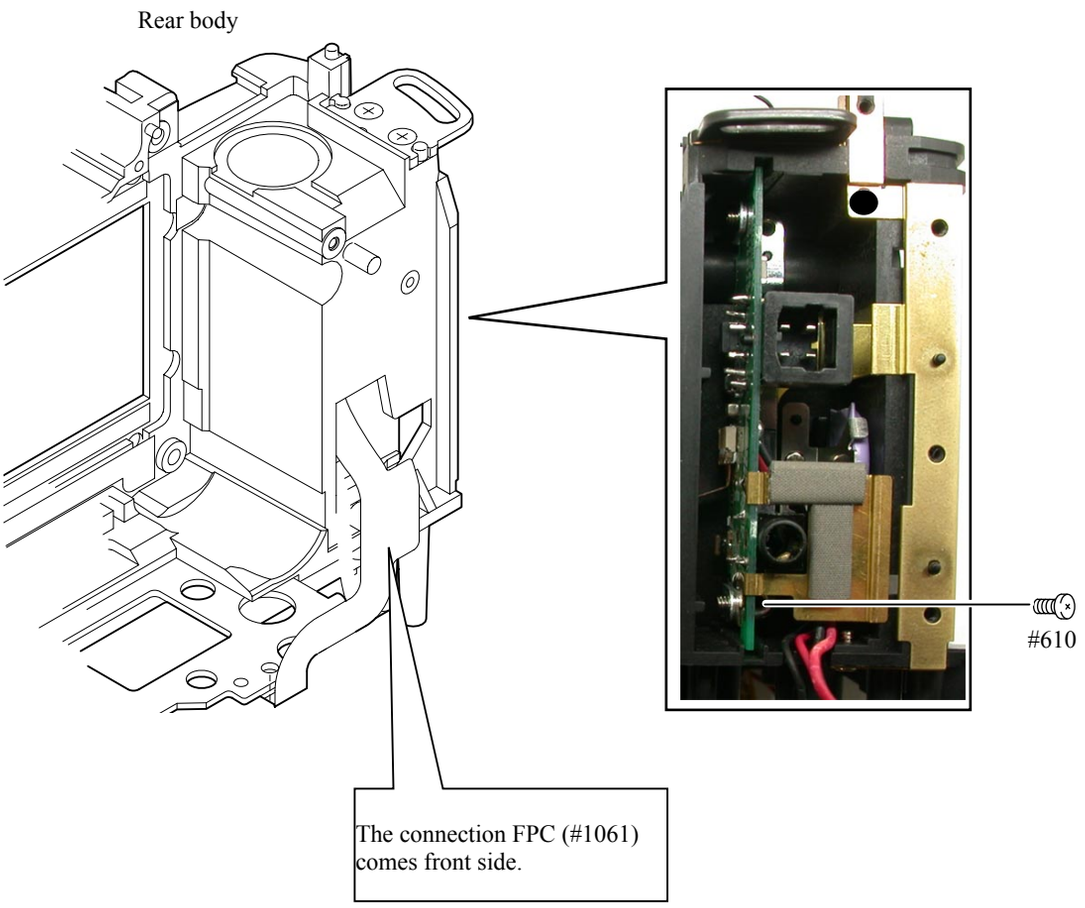


IF PCB unit

- Attach the IF PCB retaining plate (#72) on the IF PCB (#1035) with 2 screws (#610).
- Solder 2 wires (red and black).
- Attach the IF PCB shielding plate (#76) by making soldering bridges.
- Adhere 2 IF gaskets (#77) to #76.
- Atatch the connection FPC (#1061) to the connector.

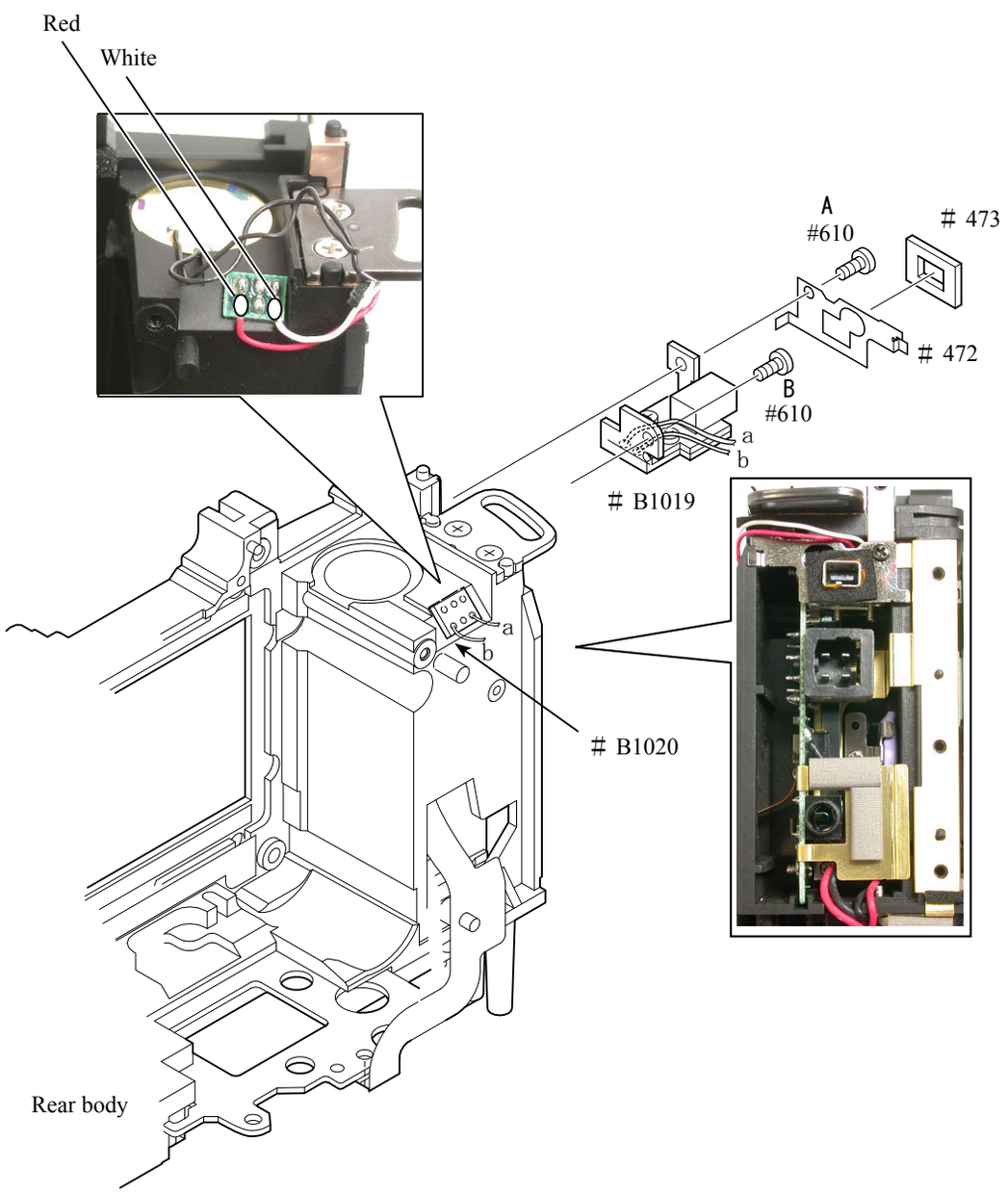


- Attach the IF PCB unit to rear body with a screw (#610).



Cable-release main board

- Fix the cable-release main board (#B1019) with the screw B (#610).
- Fix the connect-hold plate (#472) with the screw B(#610).
- Solder 2 lead wires of the cable-release main board on the connect-board unit（#B1020).

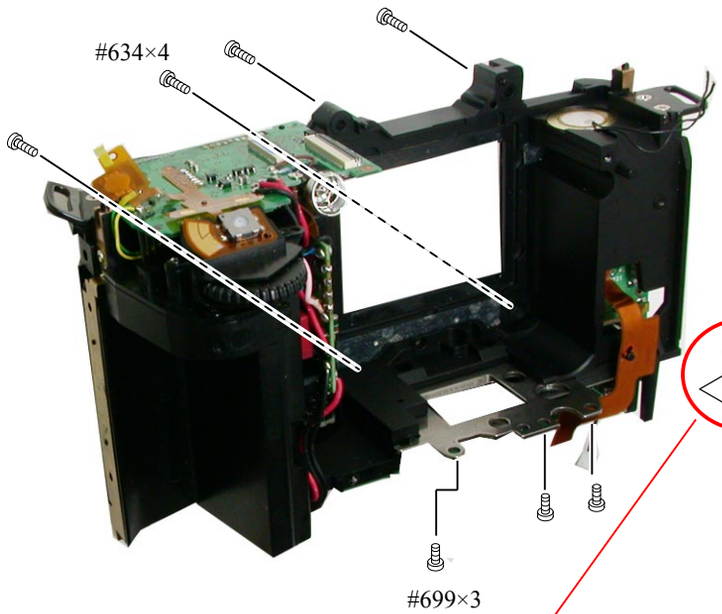


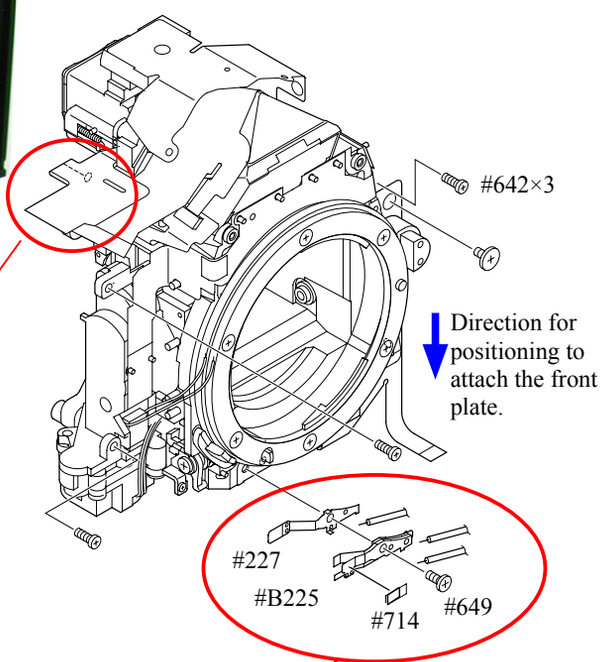
3. Mount Front body on Rear body

Mount the front body on the rear body

・Do NOT pinch wires and FPCs.

・ Attach screws by the following order. #642×3 → #634×4 → #699×3





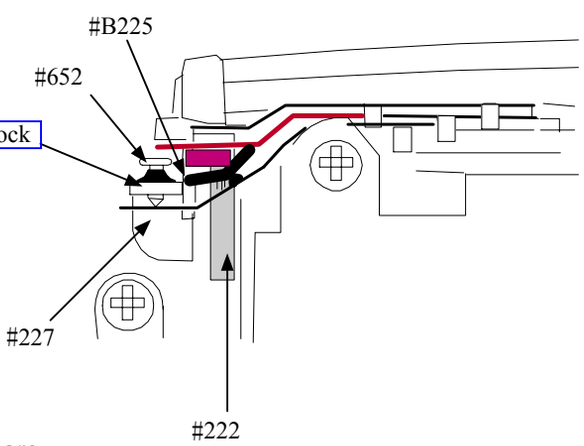
Arrange FPCs of the inner LCD by putting them into the clearance between rear body and eyepiece.

Preview SW Adjustment

① Press the lever (#222) with screw driver, etc from the bottom of the body so that it touches the uppermost part.

② In the state of ①, make an adjustment by turning the screw #652 so that #227 and #B225 slightly touch with each other.

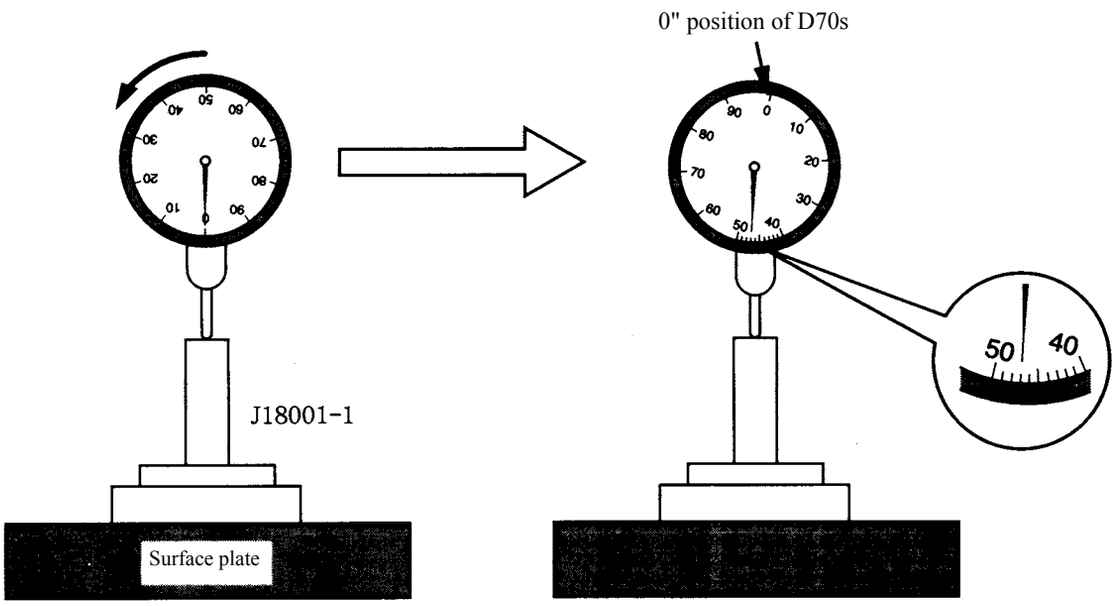
③ Adhere the screw (#652) with screw lock.



＊ Note:
Preview switch blade is easily bent, so handle it with care.

Inspection and Adjustment of Body back

＊ "0" positioning of the dial gauge

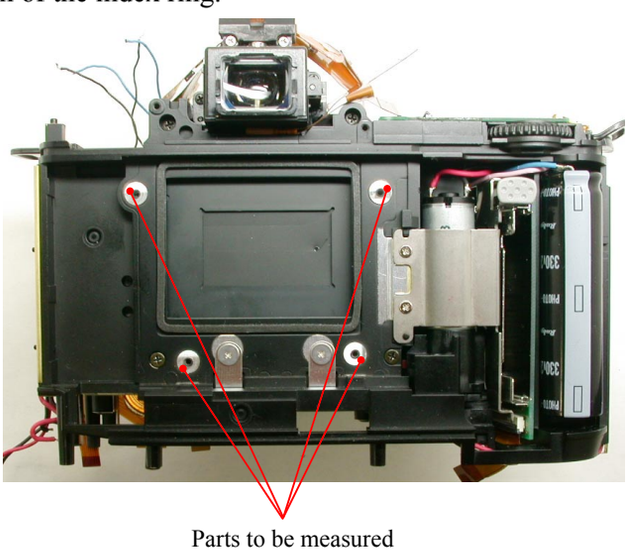


① Put the tool (J18001-1) on the surface plate, and set the dial gauge to "0".
② Turn the index ring to shift the position by "0.47 mm" from "0" that was set in ① .
(This position is "0" of D70s.)
③ Measure the body back based on "0" reference position of the index ring.

・ Measure 4 parts from the bayonet face to the CCD-PCB attaching face.

Standard:48.2±0.015mm/ Parallelism: within 0.015mm

・In case it is out of standard, make an adjustment by loosening screws that attach the front and rear bodies, or by putting the washer(s) on the contact surface between the front body and rear body.



Note: For some bodies, washer(s) are already put on the attaching face of the CCD-PCB.
There are 2 cases as follows.

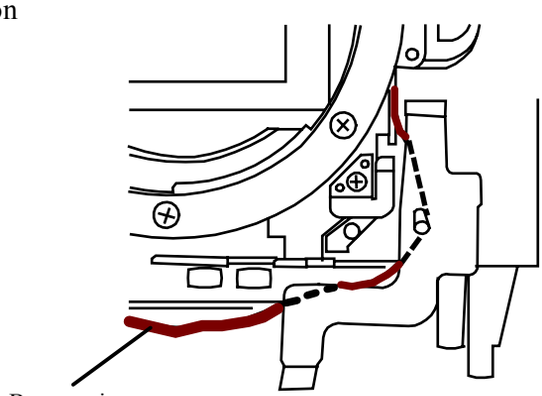
1. Purpose：To adjust the height of the camera body
There are indications(color mark) on the camera body side of the CCD-PCB attaching face
Blue 1Line=0.02mm, Blue 2Lines=0.02mmx2, Green 1Line=0.06mm, Red 1Line=0.1mm

＊ By adding the measured value to the thickness of washers, check if it is within the standard (48.2±0.015mm).

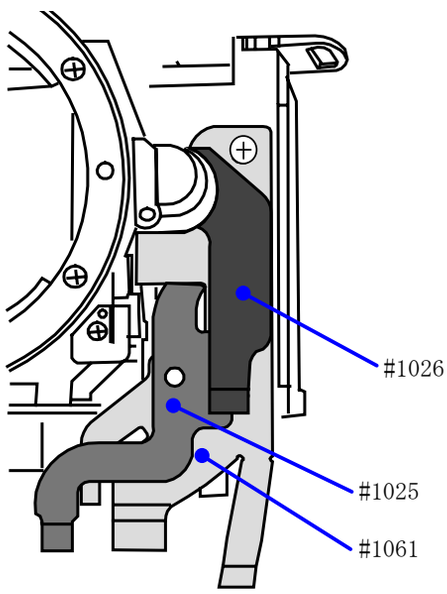
2. Purpose：To adjust the height of the CCD-PCB
There is no indication.

＊ When the CCD PCB is replaced, remove the washers.

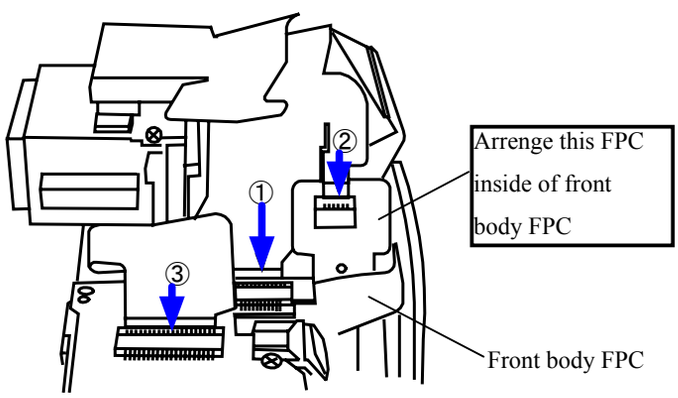
・Arrange the brown wire that was soldered on the main PCB (ref. Page A11).



・Arrange each FPC.

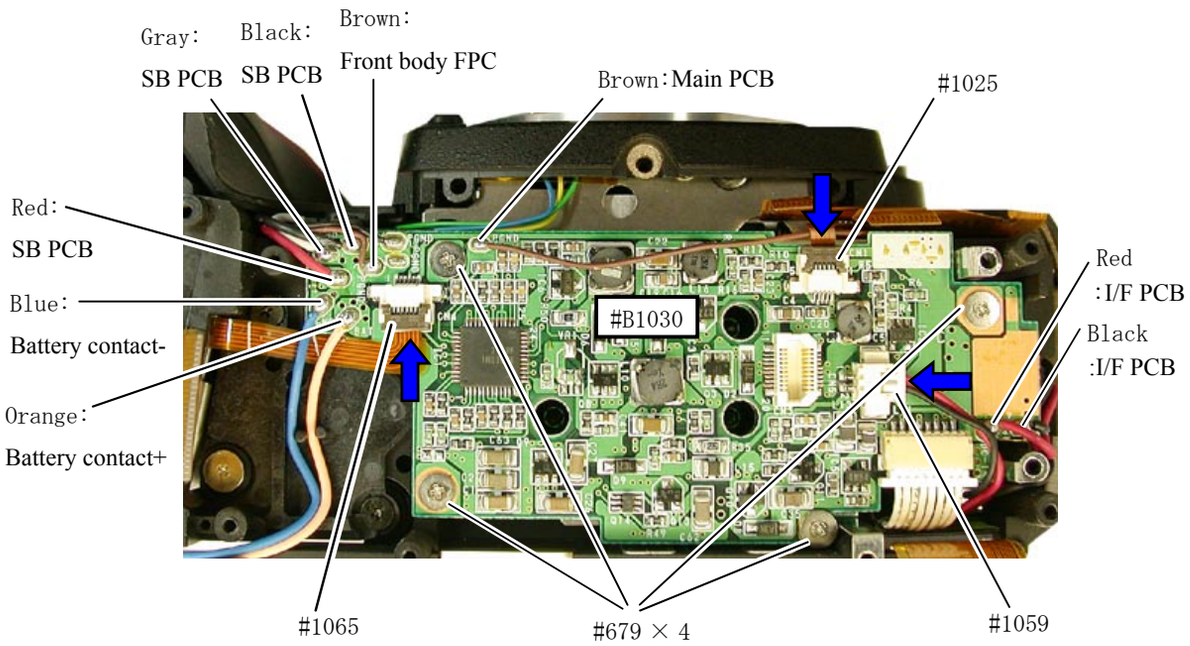


・Connect each FPC to the connectors in the order of ①, ②, and ③.

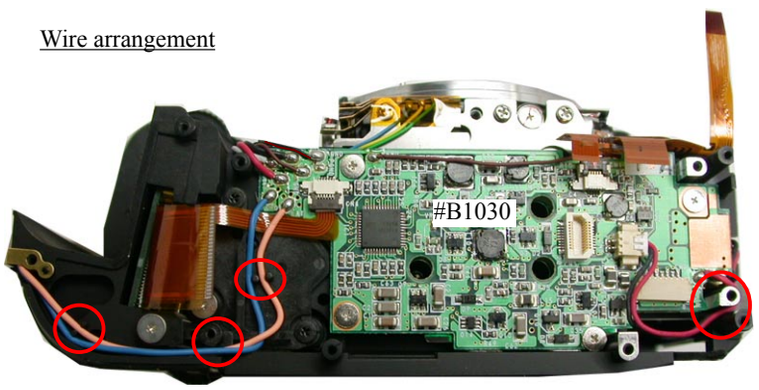


DC-DC PCB

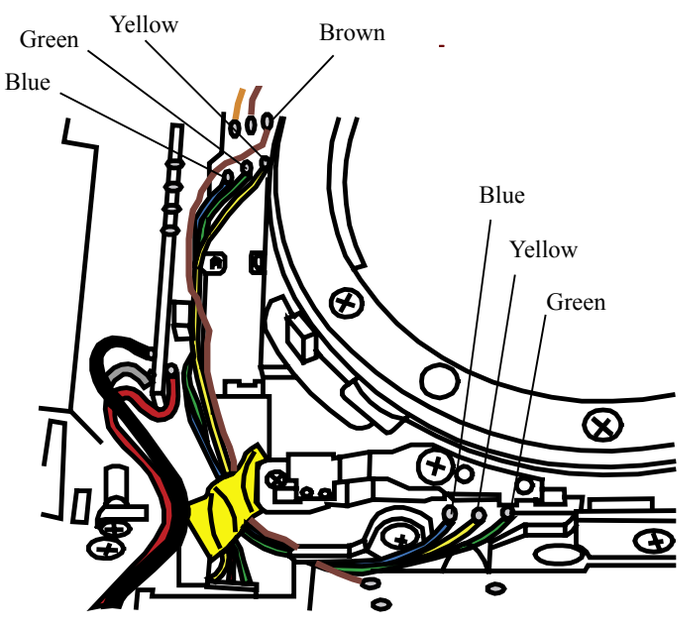
- Attach the DC-DC PCB (#B1030) with 4 screws (#679).
- Solder 9 wires.
- Connect the connection FPC (#1065), connection FPC (#1025), and secondary battery (#1059) to each connector of #B1030.



Wire arrangement



- Solder 7 points.

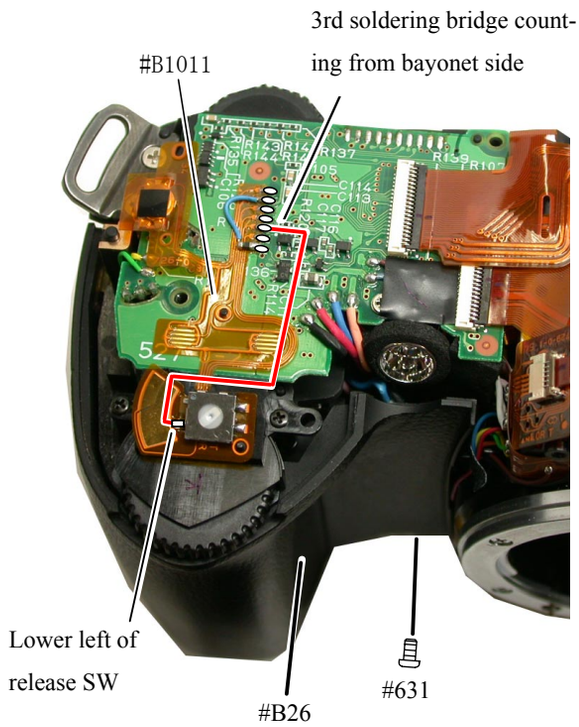


Inspection and adjustment of AE CCD Alignment

・Procedure

① To prevent short circuit, attach the grip (#B26) with the screw (#631).Insert AECCD aligment tool(J15411) between the FD screen and the SI plate.

② Connect 2 parts of the main SW FPC unit (#B1011) with jumpers. ＊ 2 parts = Red line as shown right
i.e. at lower left of the release SW and the 3rd soldering bridge counting from the bayonet side.



③ Connect the camera and PC with the communication tool (J61205) and MC-31 (J19109).
(ref. Page A36-A37)

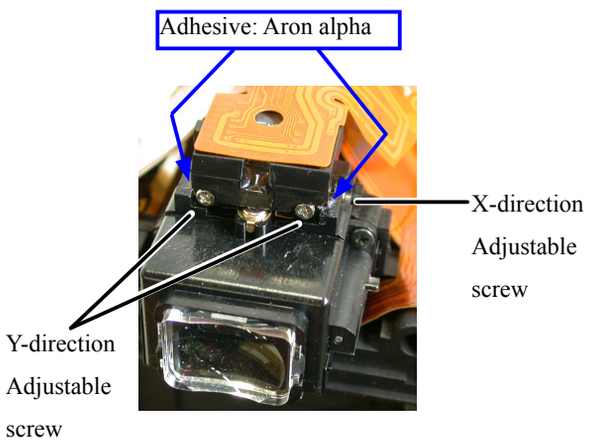
④ Provide power to camera via AC adapter EH-5.
＊ Note: Be careful of short circuit where there is no cover.

⑤ Start up the inspection and adjustment software for D70 (J18361), and select "INSPECTION AND ADJUSTMENT FOR AECCD POSITION" then "CCD ALIGNMENT INSPECTION AND ADJUSTMENT".

⑥ By following instructions on PC, make the position adjustment of AECCD by 3 screws.

⑦ Select “CCD SLANT INSPECTION” of the adjustment software and make an inspection.

⑧ After the adjustment, fix the AECCD by applying Aron alpha (super glue) slightly.



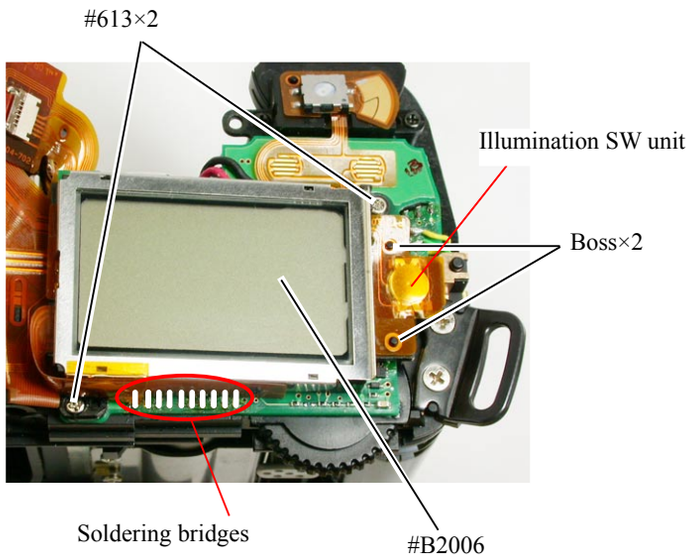
⑨ Remove EH-5,the communication tool (J61205) and AECCD aligment tool(J15411) .

⑩ Remove the jumper wire of ② .

⑪ Take out the screw (#631) and grip (#B26).

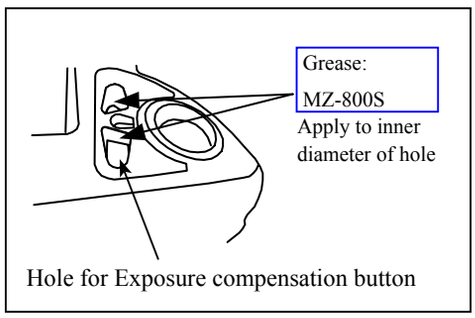
Outer LCD

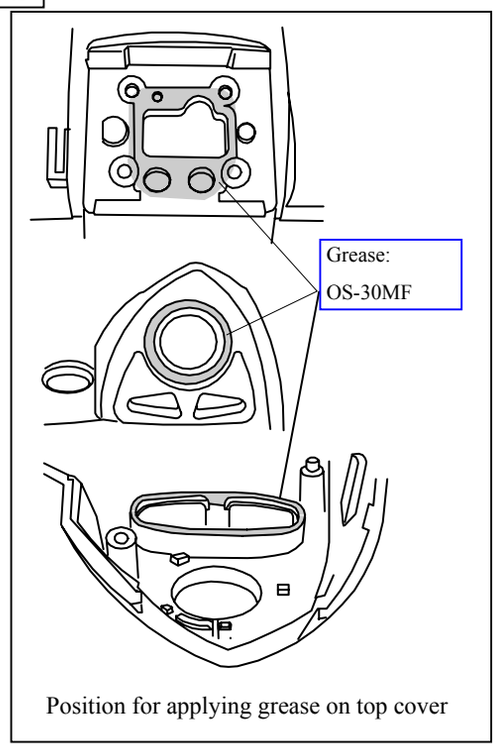
・Attach the outer LCD (#B2006) with 2 screws (#613).
・ Assemble the illumination SW unit by aligning 2 bosses.
・ Make soldering bridges.

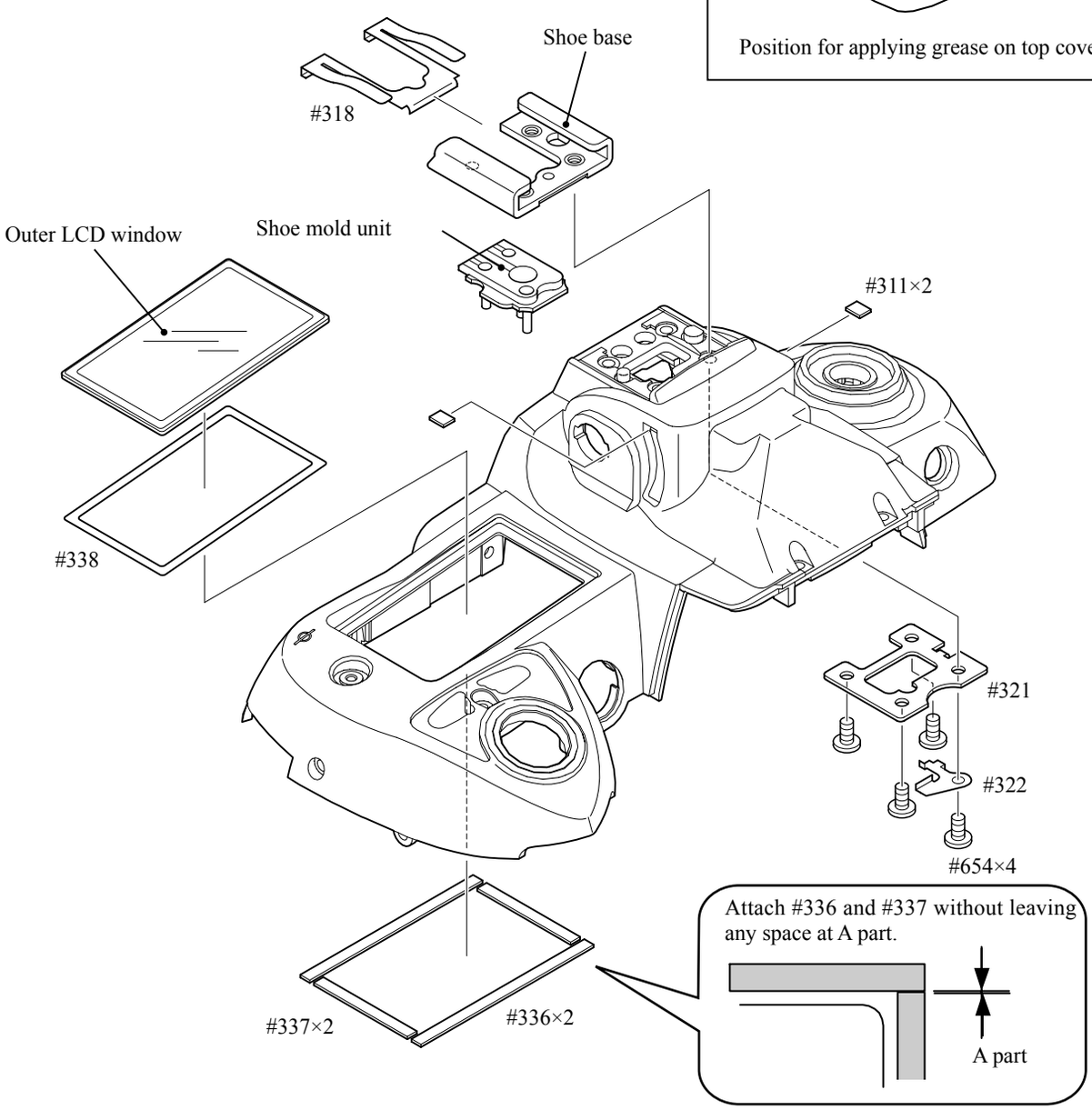


Assembly of Top cover unit

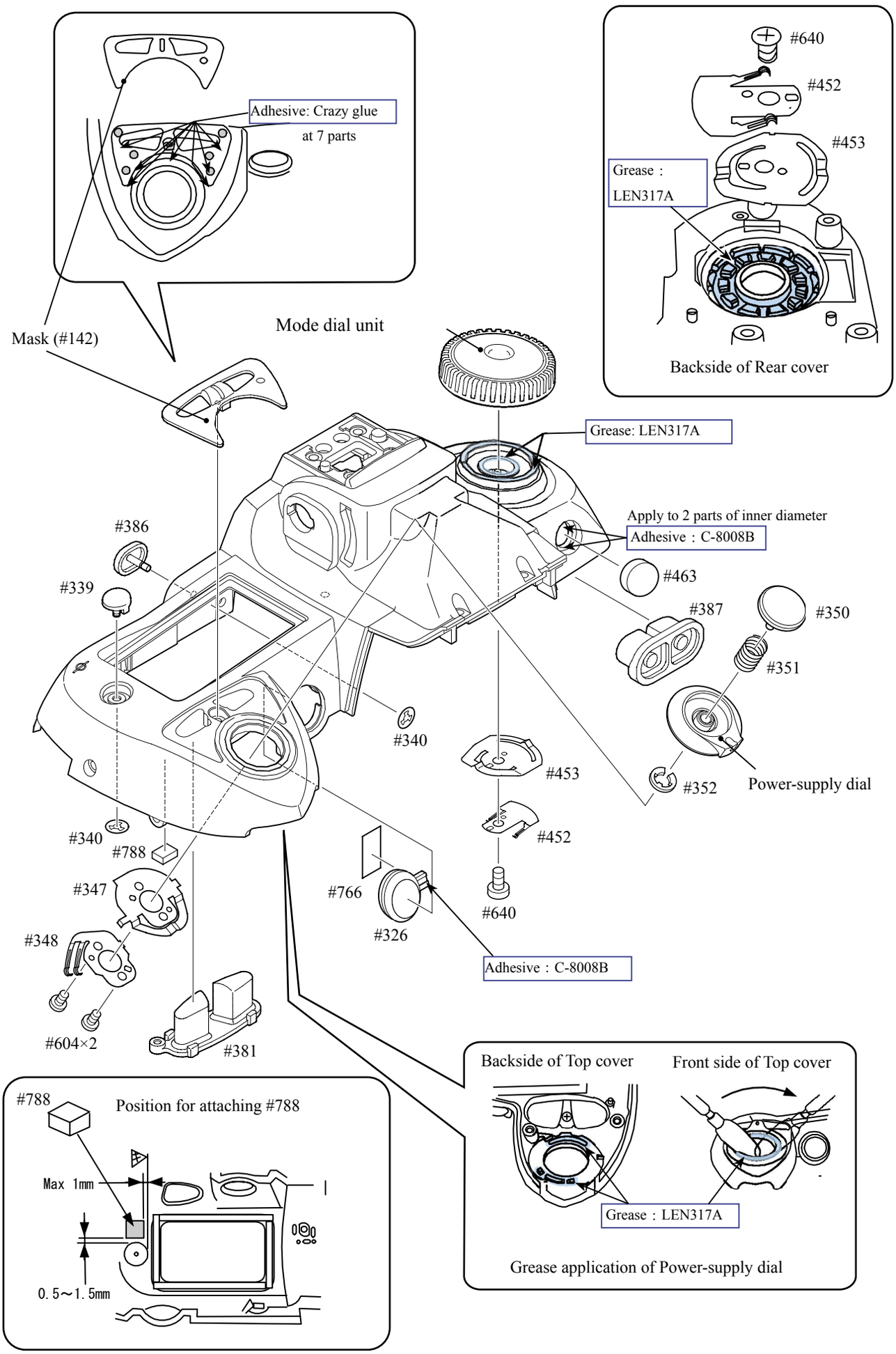
Outer LCD window, Shoe mold unit, Accessory shoe, other small parts





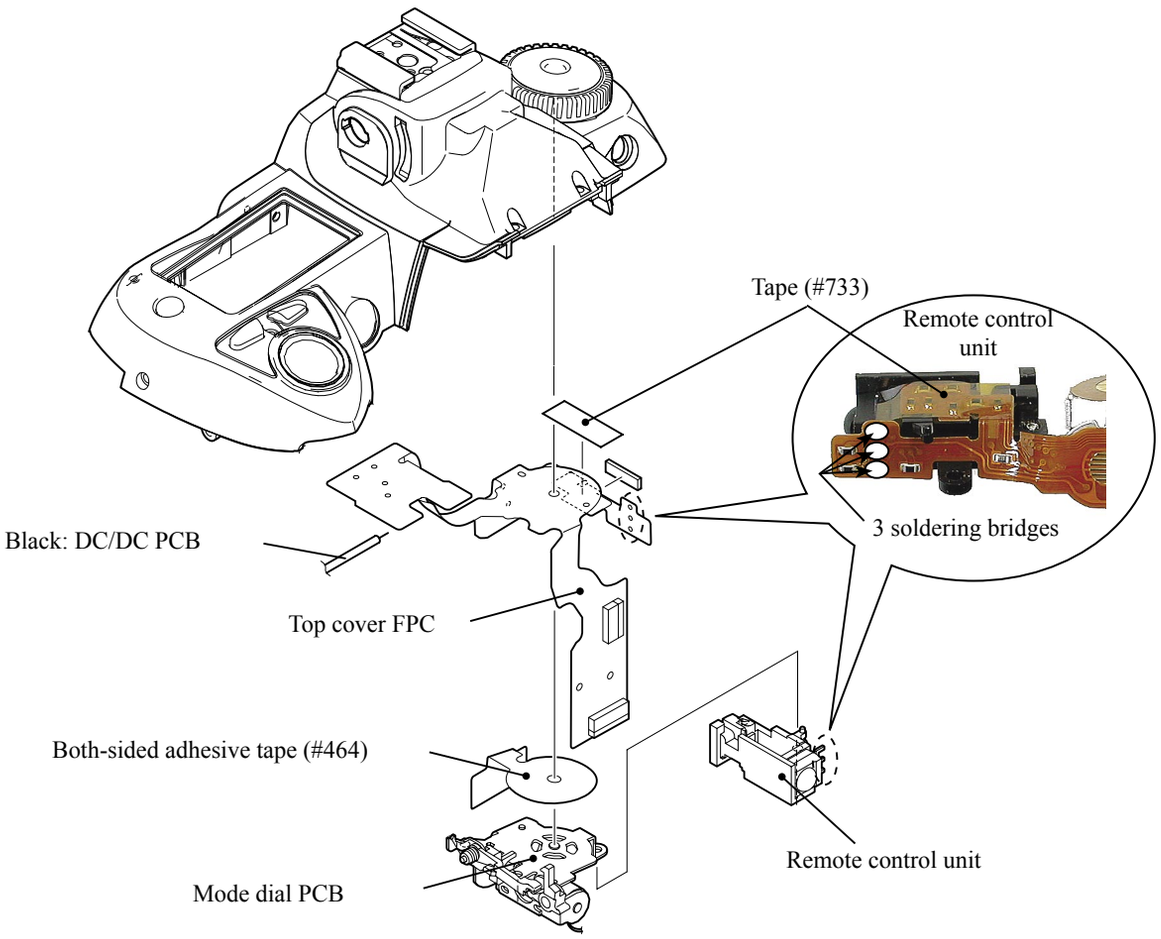


Power-supply dial, Release button, Mode dial unit, other small parts

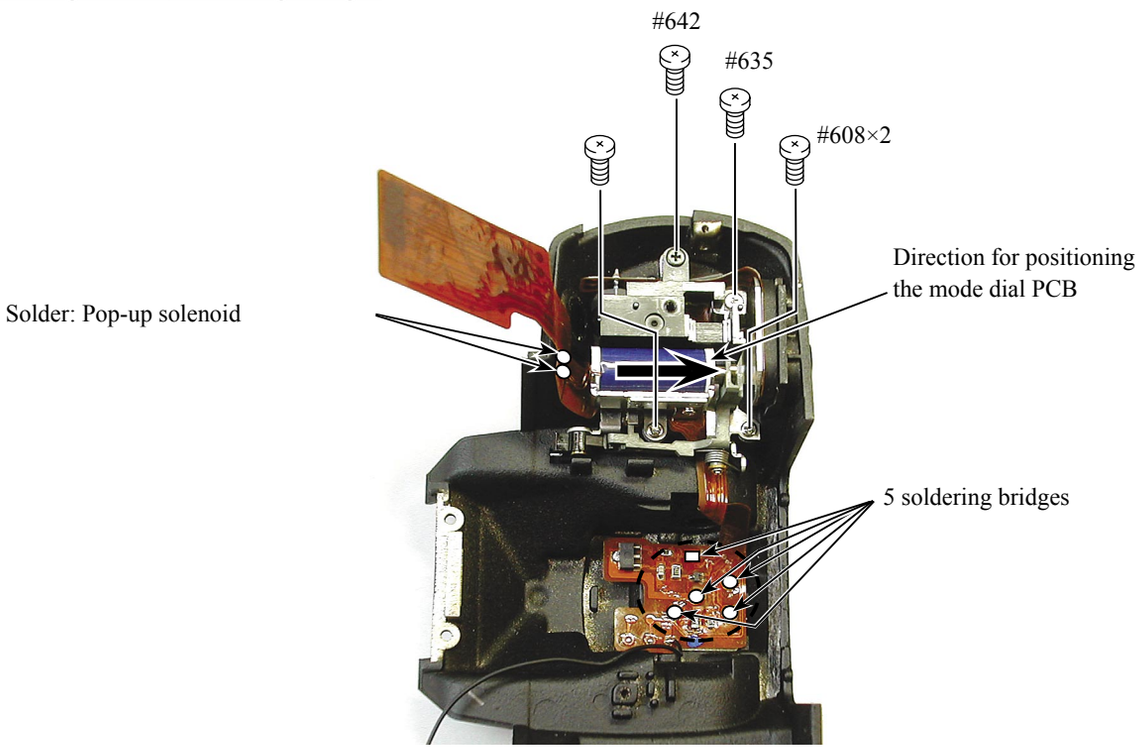


Top cover FPC, Remote control unit, Mode dial PCB

Attach Mode dial PCB and Remote control unit to Top cover FPC



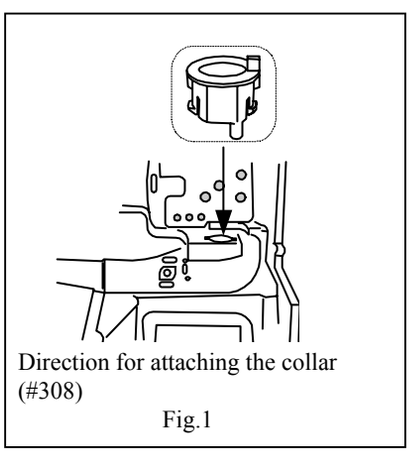
Attaching screws, soldering bridges



SB lower case unit

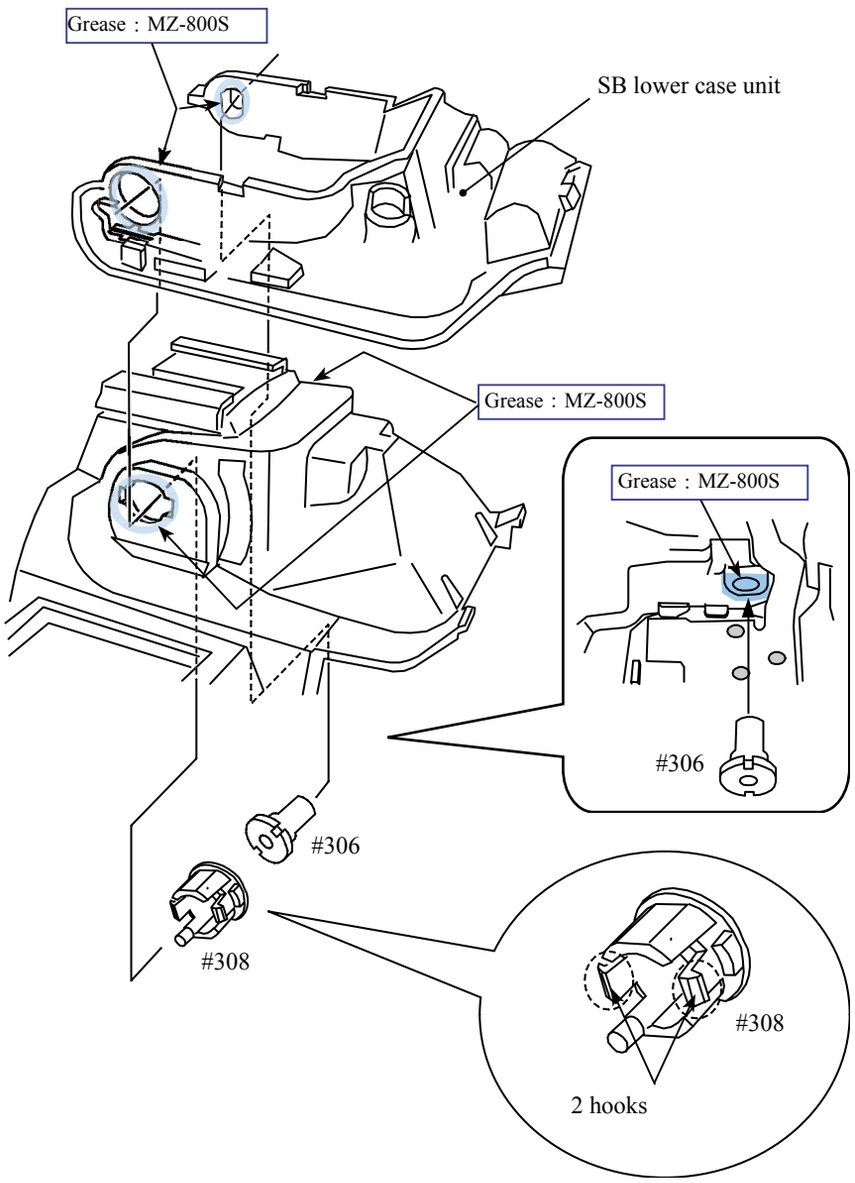
Attach SB lower case unit

- Mount the SB lower case unit on the top cover.
- Insert the collar (#308) by following the direction as shown in Fig.1, and fix it with 2 hooks.
- Insert the SB case axle (#306) in the top cover.
- Pass each wire throuth the hole of the collar (#308).



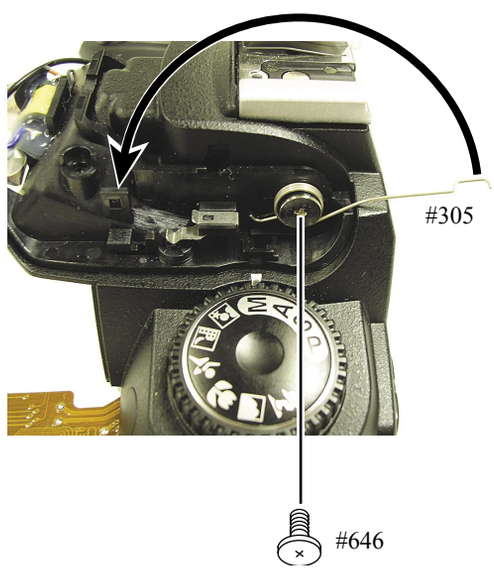
Direction for attaching the collar (#308)

Fig.1

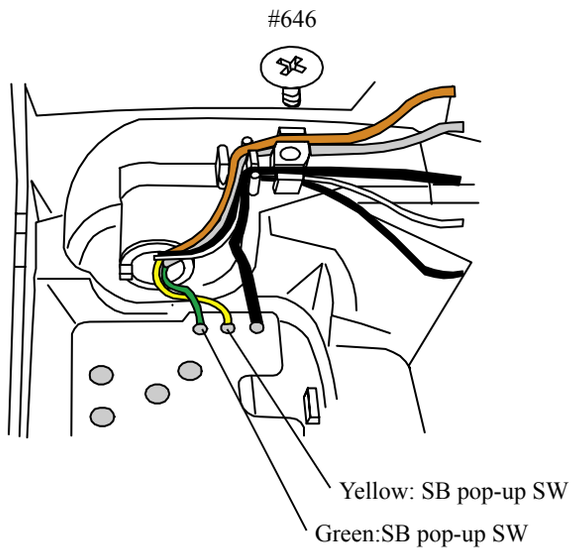


Attach Flash-up spring

- Attach the Flash-up spring (#305) and fix it with the screw (#646).
- Hook the Flash-up spring (#305) by following the direction of the arrow.

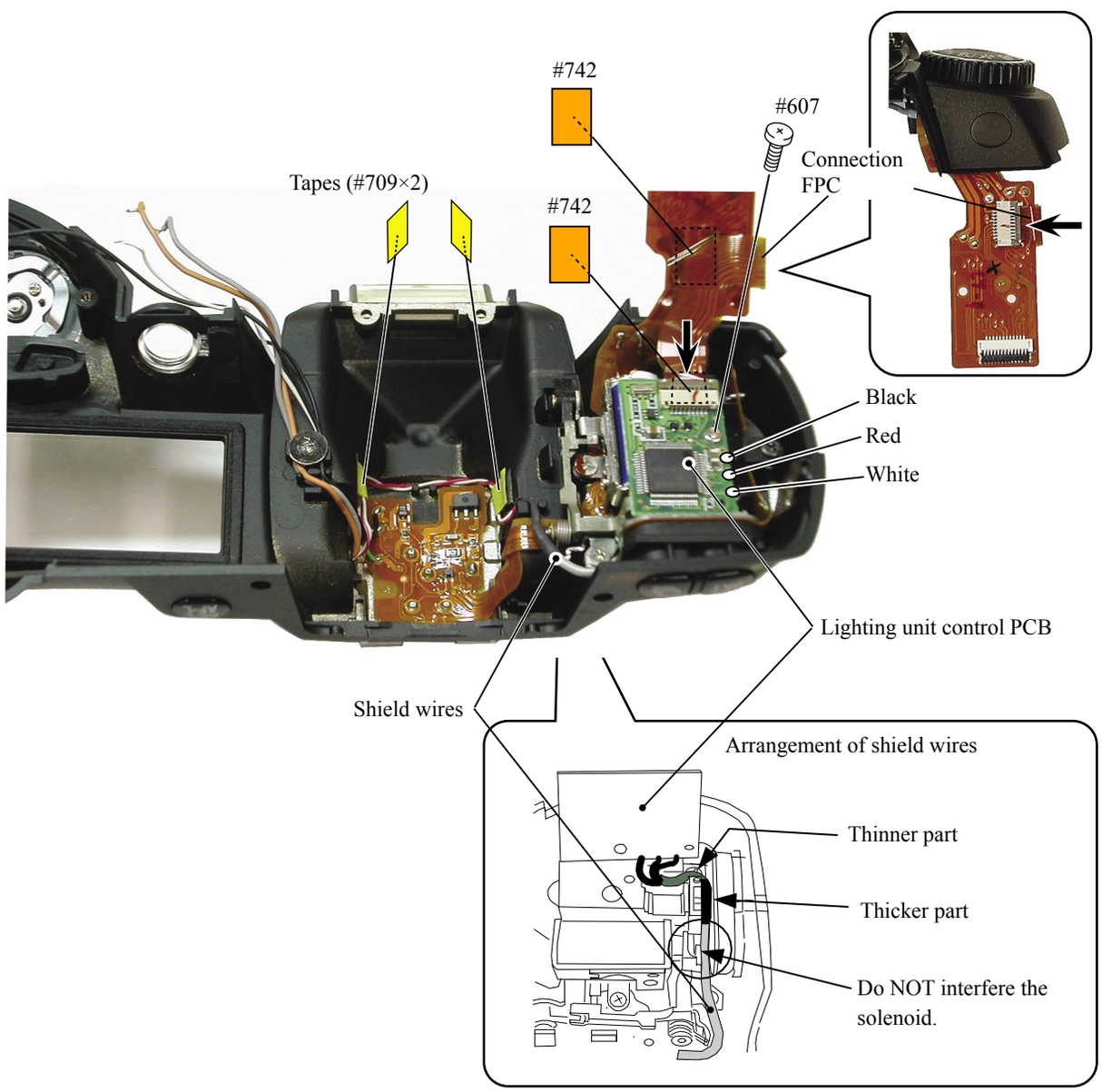


Solder wires, wire-atatching screws

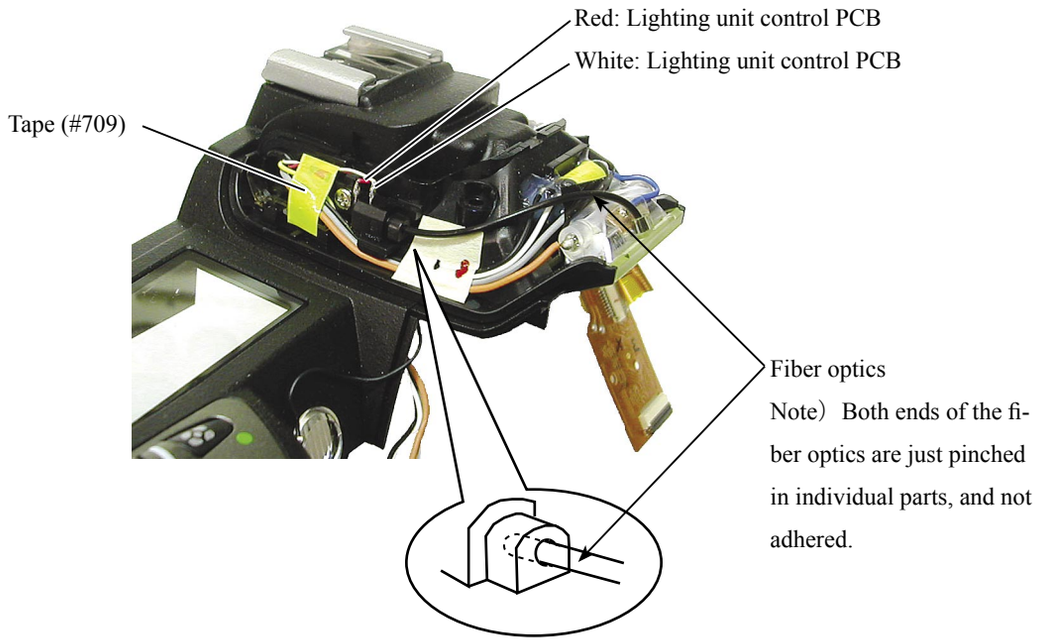


Lighting unit control PCB

Arrange shield wires, Attach lighting unit control PCB



Solder Shield wires


Red: Lighting unit control PCB
White: Lighting unit control PCB
Tape (#709)
Fiber optics
Note） Both ends of the fiber optics are just pinched in individual parts, and not adhered.

SB upper case

- Attach the SB uper case on the SB lower case.（Fig.1）
- By pushing the pop-up lever A part of the top cover unit, activate pop-up of the built-in SB.
- Confirm that the hooking lever of the SB upper case is hooked to 2 holes.（Fig.2）
- Attach 2 screws (#631).

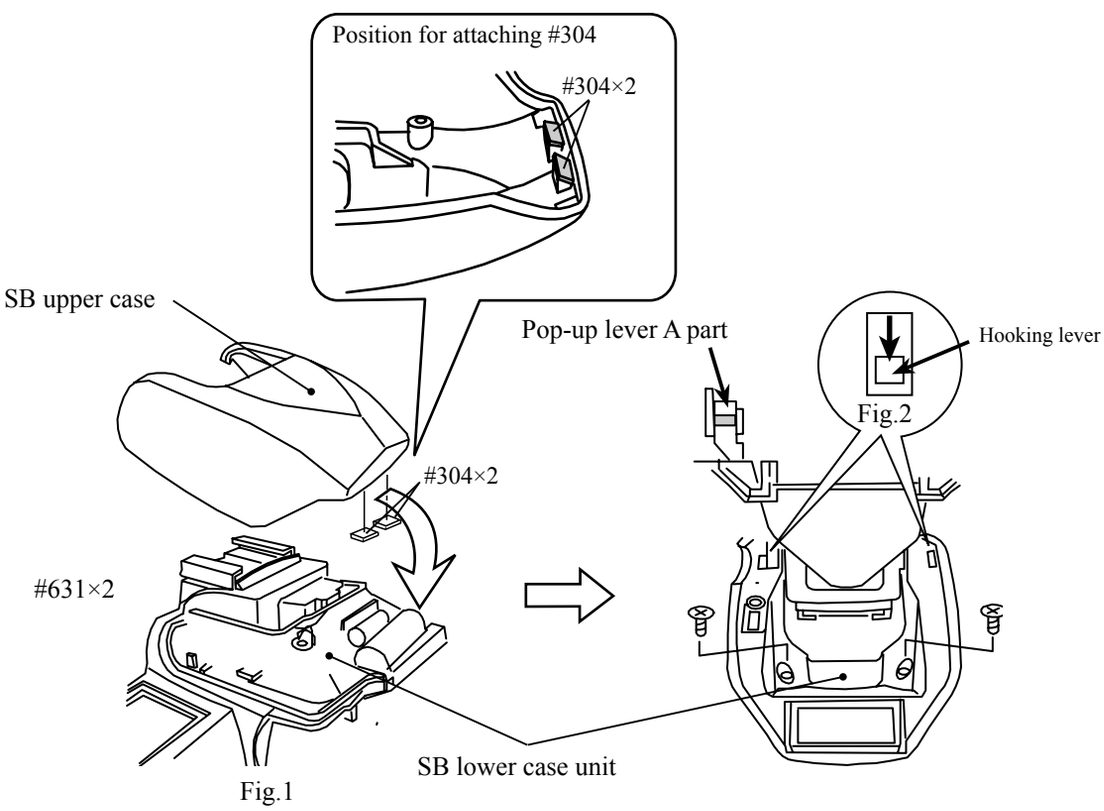


Fig.1

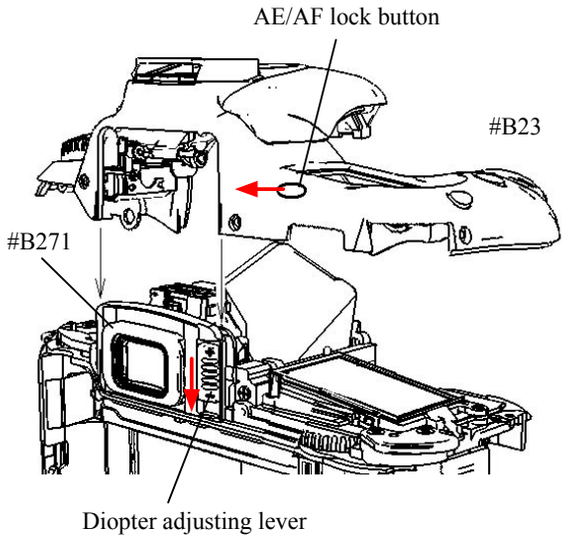
Fig.2

Top cover

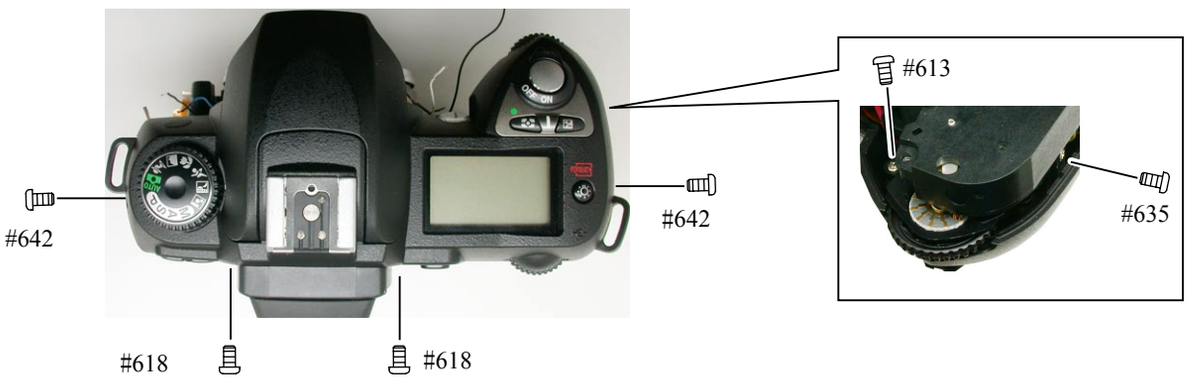
・Assemble the eyepiece frame (#B271) by putting the diopter adjusting lever at the lowermost position.

・After pushing outside the AE/AF lock button from the inside of the top cover, assemble the top cover (#B23).

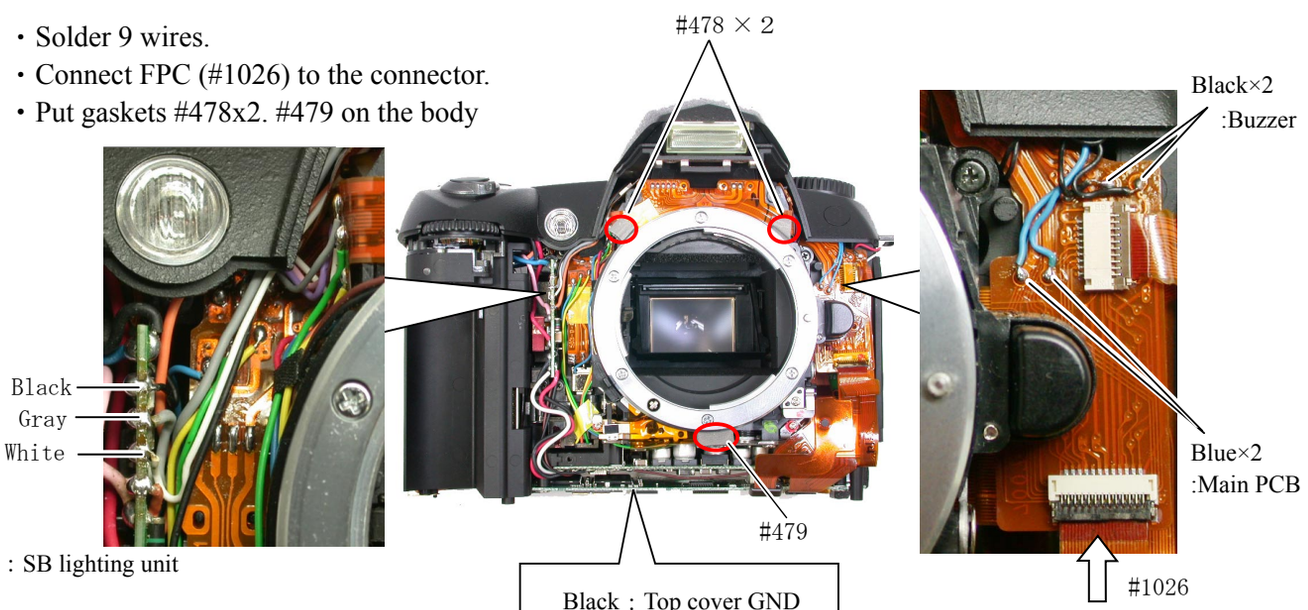
・After assembling the top cover, slide the diopter adjusting lever to check the movement of the diopter adjustment lens.
Also, check the clicking feeling of the AE/AF lock button, too.



・ Attach 6 screws.



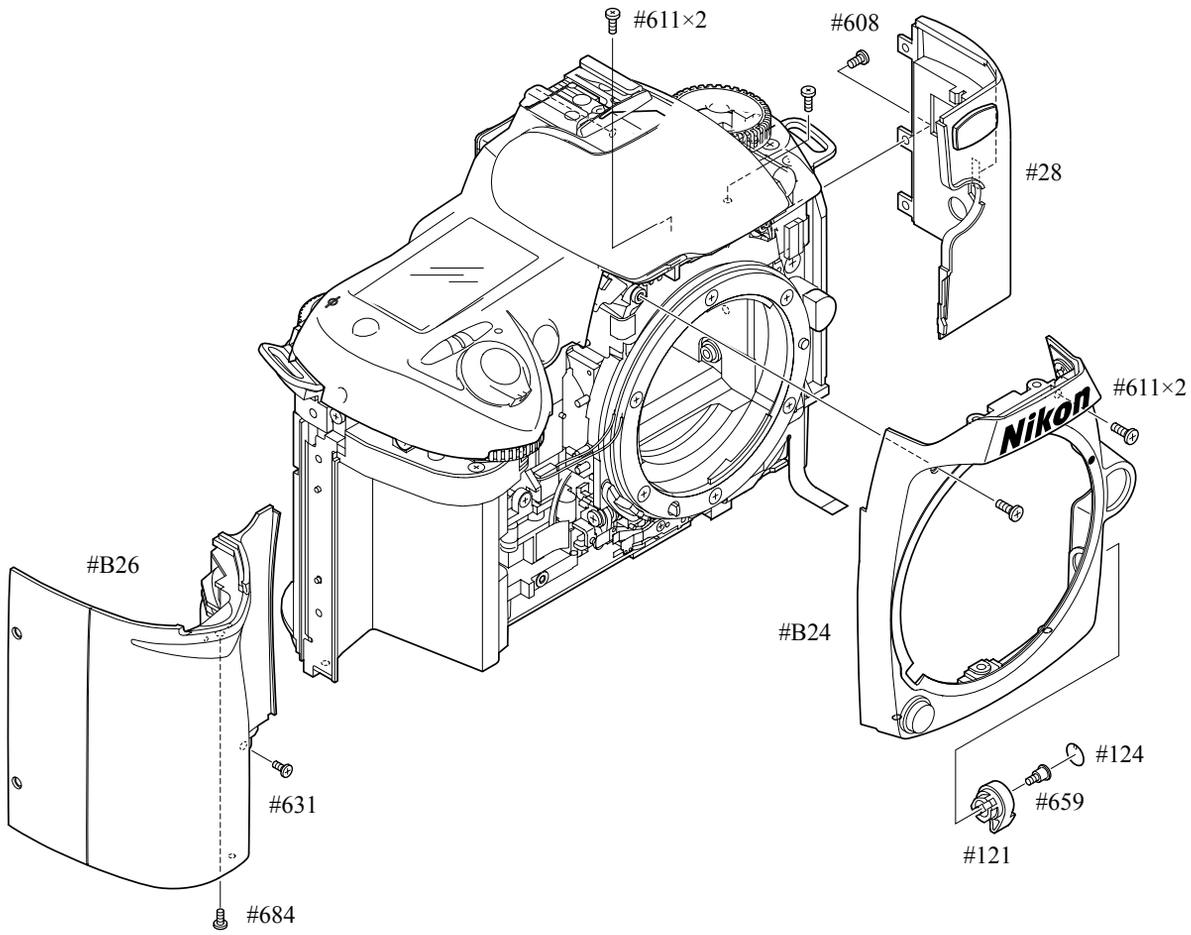
・Solder 9 wires.
・Connect FPC (#1026) to the connector.
・Put gaskets #478x2. #479 on the body



Covers

・Assemble the front cover (#B24) at the last stage.

・Pop the SB lighting unit up and attach it with 2 screws (#611).



Gap adjustment of SB lighting unit

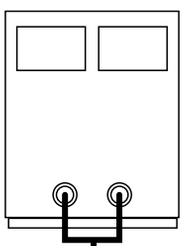
・In case it is out of standard, pop the SB unit up and make an adjustment by turning the adjusting dial with Hexagonal wrench.

Standard : 0 ～ 0.5mm

Accuracy inspection and adjustment (Camera body)

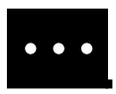
- To connect to PC, as shown below, connect MC-31 (J19109) to the connector of RS232 on PC, then attach the communications tool (J61205) to the connection FPC of camera.
  (Refer to next page for how to connect J61205)

Stabilized power supply
Set value ＝ 7.8V 0.3Ω 5.0A
or AC adapter EH-5



Battery tool
J61197

Connection FPC



AECCD
alignment tool
(J15411)

J61205

＊ Note：
When checking “battery check”, be sure to use the battery tool (J61197).

Note)
When connecting to PC by the communications tool (J61205) with the memory compression PCB attached, be sure to remove the ＊ -marked FPC from the connector on Page A42.

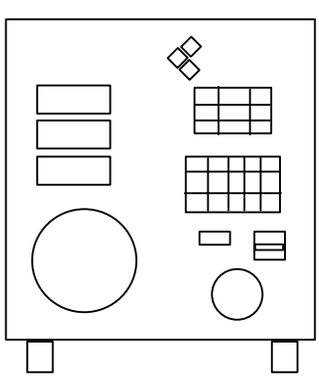
J19109

In case of 9 pin type terminal of RS232C, connect by using 25 pins-9 pins converting connector. But this is not provided by RJ, so use goods on the market.

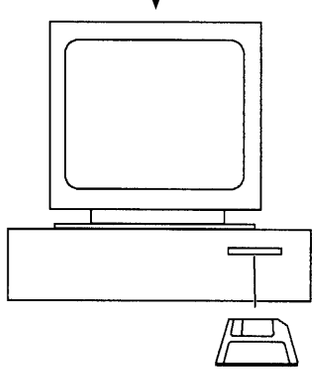
To RS232C terminal

Flash meter
Not prepared as RJ

Shutter tester (EF-8000, etc)



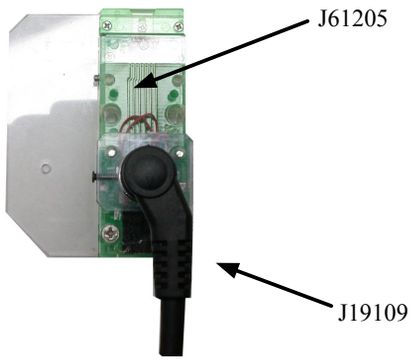
AF50/1.4D



J18383
D70s inspection and adjustment software

How to connect communications tool (J61205)

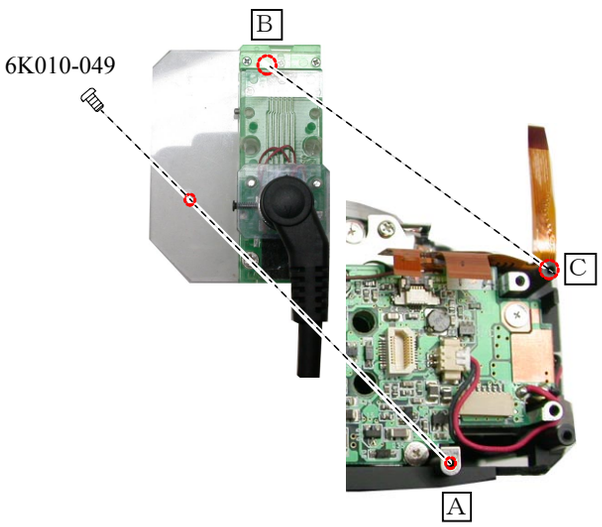
① Connect the communications tool (J61205) to MC-31 (J19109).



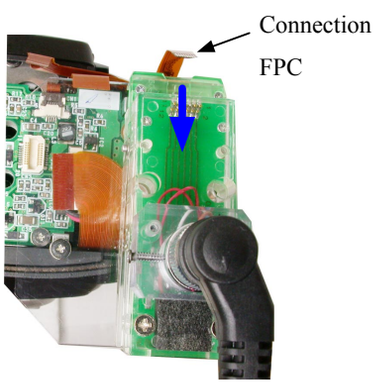
② Attach the communications tool temporarily to the body A with the screw (6K010-049) which is included in package.

③ Loosen the screw (6K010-049) and screw it lightly again at the position where the shaft C of the body can enter in the hole B of the communications tool.

Note: Do NOT tighten screw completely.



④ Pinch the contact part of the connection FPC with the communications tool to make a connection.



⑤ Connection is completed.

＊ Note:
This tool is fixed with just a one screw, so handle the camera very carefully when the tool is attached.

D70s Inspection and Adjustment Software (J18383)

This inspection and adjustment software runs on Windows.

Install the software by following the below procedure.

<Operating environment>

The following operating environment is required for installing this program on PC.

【In case of using Serial interface】

PC	IBM PC/AT compatible
OS	Windows XP Professional Edition, Windows XP Home Edition, Windows Millennium Edition (Me), Windows 98 Second Edition (SE), Windows 98, Windows 95
CPU	80486 100MHz ～ Pentium 4 2.2GHz
RAM (memory)	32MB or more
HD	6MB-or-more free disk space is required when installing
Monitor resolution	800×600 pixels or more
Interface	Serial Interface

【In case of using USB interface】

PC	IBM PC/AT compatible
OS	Windows XP Professional Edition, Windows XP Home Edition, Windows Millennium Edition (Me), Windows 98 Second Edition (SE)
CPU	Pentium Ⅱ 266MHz ～ Pentium 4 2.2GHz
RAM (memory)	64MB or more
HD	6MB-or-more free disk space is required when installing
Monitor resolution	800×600 pixels or more
Interface	USB Interface : USB1.1

As long as the above hardware requirements are met, any PC such as desktop or laptop, etc is available.

From Version 2.00 or higher, the USB interface can be used. However, be noted that the hardware requirements are different as shown above.

＜ File ＞

D70.exe Application executable file

Nk_PTP.INF INF file：Install file for PTP control driver

NKCamUSD.dll Library file：File for registering PTP control driver

NkdPTP.dll Library file：USB communication application extension file
For Windows XP

NkdPTPDi.dll Library file：USB communication application extension file
For Windows 98 SE; Windows Me

PTPControl PTP driver file : For Windows 98 SE; Windows Me

<Notice on start-up>

When starting this program, close all the other applications.

If some other applications are running, this program may not be activated.

<Procedure for installation>

The file (D70sSOFT.EXE) of this program is provided via FD or e-mail.

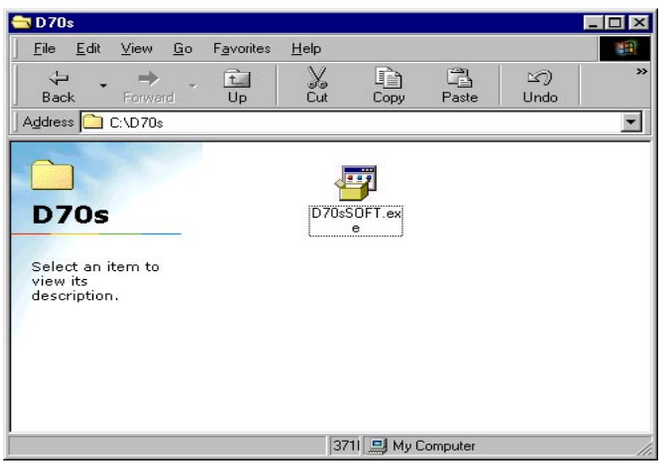
Because this is the self-extracting file, decompress the file before installing, following the next procedure.

The operating system used here is "Windows 98 SE".

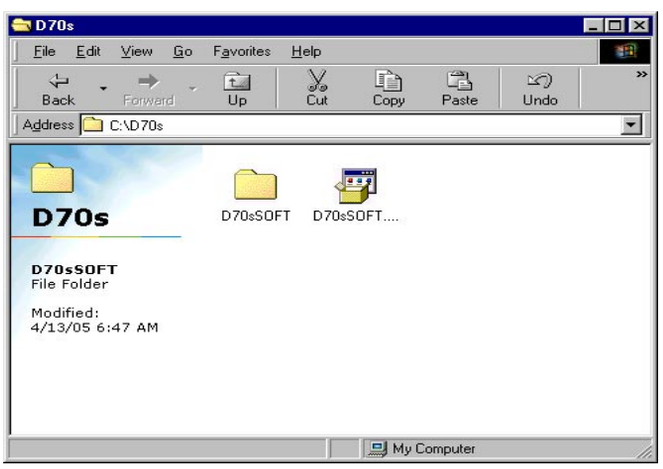
1. Create a folder for installation under a name you like and PC drive.

   (e.g.) C:\D70s

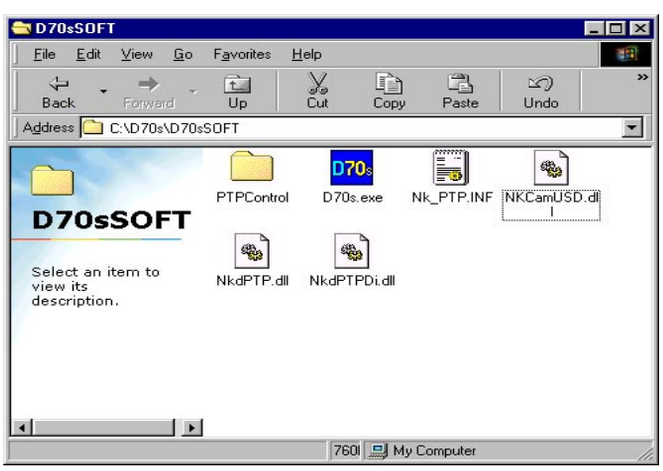
   Paste the file (D70SOFT.EXE) in the created folder.



2. Double-click on the pasted file to display the following screen.



3. Open the folder D70sSOFT , the following 5 files and PTPControl folder are appeared.



＜ How to install USB driver ＞

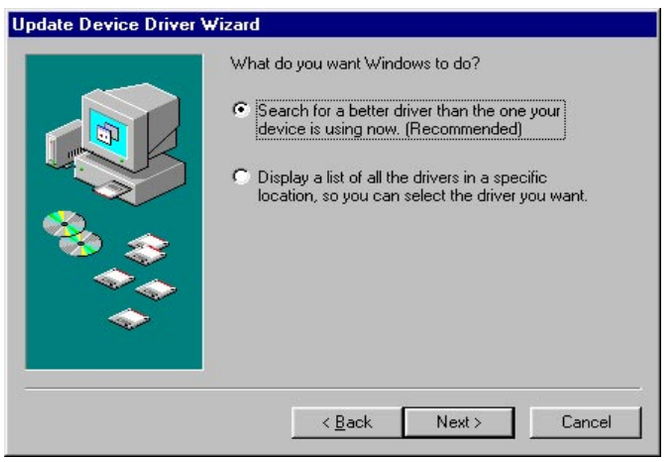
If this program is used by the USB interface, installing the USB driver is necessary.

But if the OS is "Windows XP", the driver is already preloaded so it is not necessary to install it.

1. Set the USB of camera to "PTP".
   (SETUP menu → USB setting → PTP)

2. Connect the camera and PC by USB cable.
   Turn camera ON.

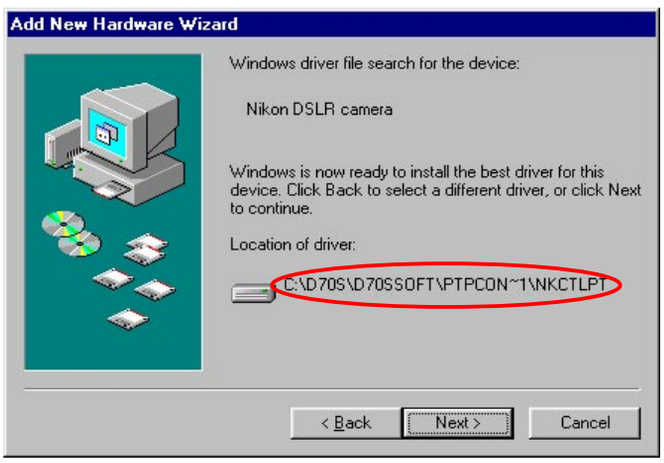
3. Select "Search for a better drive than the one your device is using now. (Recommended)", and click "Next".


Update Device Driver Wizard
What do you want Windows to do?
Search for a better driver than the one your device is using now. (Recommended)
Display a list of all the drivers in a specific location, so you can select the driver you want.
< Back
Next >
Cancel

4. Check the box of "Specify a location" and select "¥D70sSOFT¥PTPControl " of C drive. Then click “Next”.

Update Device Driver Wizard
Windows will search for updated drivers in its driver database on your hard drive, and in any of the following selected locations. Click Next to start the search.
Floppy disk drives
CD-ROM drive
Microsoft Windows Update
Specify a location:
C:\D70s\D70sSOFT\PTPControl
Browse...
< Back
Next >
Cancel

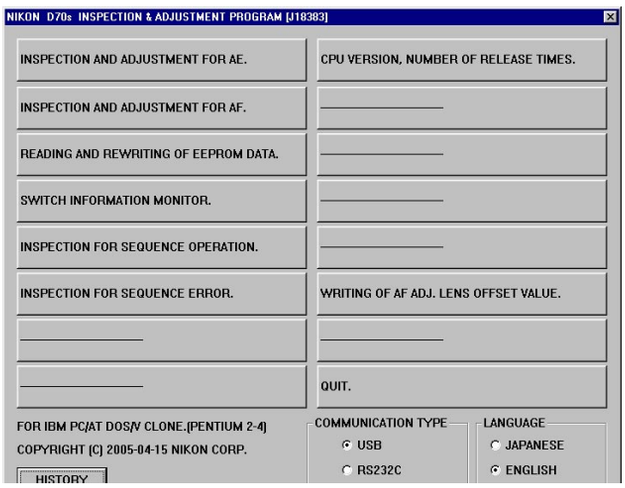
5. Confirm that the driver is located at the right place, and click "Next".


Add New Hardware Wizard
Windows driver file search for the device:
Nikon DSLR camera
Windows is now ready to install the best driver for this device. Click Back to select a different driver, or click Next to continue.
Location of driver:
C:\D70S\D70SSOFT\PTPCON~1\NKCTLPT
< Back
Next >
Cancel

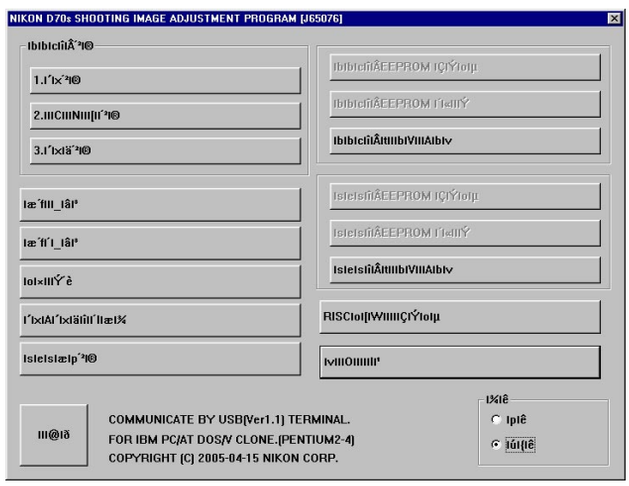
6. Click "Finish" to complete the installation.

<Start-up of Program>

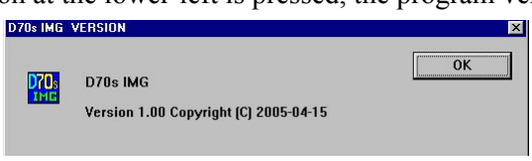
1. Double-click the file (D70s.EXE), then the Inspection & Adjustment program for D70s starts.



2. To display in Japanese, select the radio button "JAPANESE" in "LANGUAGE" in the lower right-hand corner of the screen ". However, this is not properly viewed in the OS in English version
   If "Serial interface" is used, select the radio button "RS232C" in "COMMUNICATION TYPE" at the lower part of screen. If "USB interface" is used, select the radio button "USB".


NIKON D70s SHOOTING IMAGE ADJUSTMENT PROGRAM [J65076]
COMMUNICATE BY USB(Ver1.1) TERMINAL.
FOR IBM PC/AT DOS/V CLONE.(PENTIUM2-4)
COPYRIGHT (C) 2005-04-15 NIKON CORP.

3. When the "HISTORY" button at the lower-left is pressed, the program version will be displayed.



4. Select each item button according to operation.
   Follow the instructions on the next screen that will be shown after pressing the item button.

5. To finish the program, press the "Close (×)" button in the right-hand corner of the screen or "QUIT.".

AE inspection and adjustment

① AE CCD alignment inspection and adjustment （ref. Page A27 for details）
② AE accuracy inspection and adjustment
③ Aperture accuracy inspection
④ Adjustment for battery check level (Use the battery tool (J61197) and stabilized power supply.)
⑤ Built-in SB flash inspection and adjustment
Tools required〕ref. Page A36.

・Inspection on Battery check indications

After the battery check adjustment, input each voltage of the below into camera, and check the indications of the outer LCD.
Note: Make an inspection by switching the voltage in the order of ① - ⑦ .

Outer LCD indication	Set voltage of Stabilized power supply	
	① ７．８０Ｖ	⑦ ７．５０±０．１Ｖ
	② ７．３０±０．１Ｖ	⑥ ７．３５±０．１Ｖ
	③ ７．１５±０．１Ｖ	⑤ ７．２０±０．１Ｖ
Blink	④ ７．００±０．１Ｖ	

・Built-in SB flash inspection and adjustment

Set the distance between camera and flash meter to 1 m, and inspect and adjust the light volume of the built-in SB. (ref. adjustment software for details)

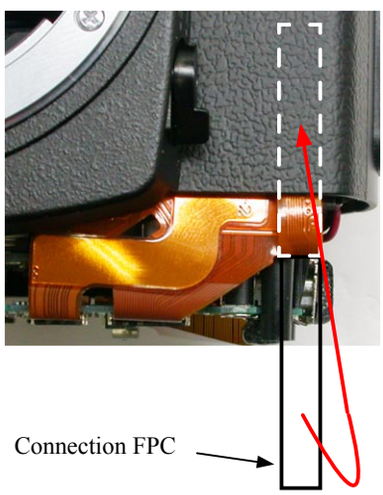
AF inspection and adjustment

Note: When using the adjustment software for the first time, prepare 5 cameras of D70s (or D70) and input the average value of the 5 cameras, which was measured when checking the AF accuracy, in "WRITING OF AF ADJ. LENS OFFSET VALUE" on the main menu.

If the file name, "D70LDAT.DAT", of the data which was obtained by the D70 adjustment software is renamed and becomes "D70SLDAT.DAT", it can be used.

① AF accuracy inspection and adjustment (Make all the following adjustments.)
② YAW, PITCH inspection and adjustment
③ LARK adjustment (inc. CCD output adjustment)

〔Tools required〕
1. When adjusting for all adjustment items
   ref. Page A36.
2. When inspecting AF accuracy
   ① AF adjustment lens (J18266)
   ② AF adjusting tool (J15259)
   ③ Lens holder for F4 (J15280)
   ④ AF chart （J18344）
   ⑤ Chart illuminator for AF （J15264）
3. When adjusting YAW, PITCH
   YAW, PITCH tool （J18230）
4. When adjusting LARK
   The above tool when inspecting AF accuracy



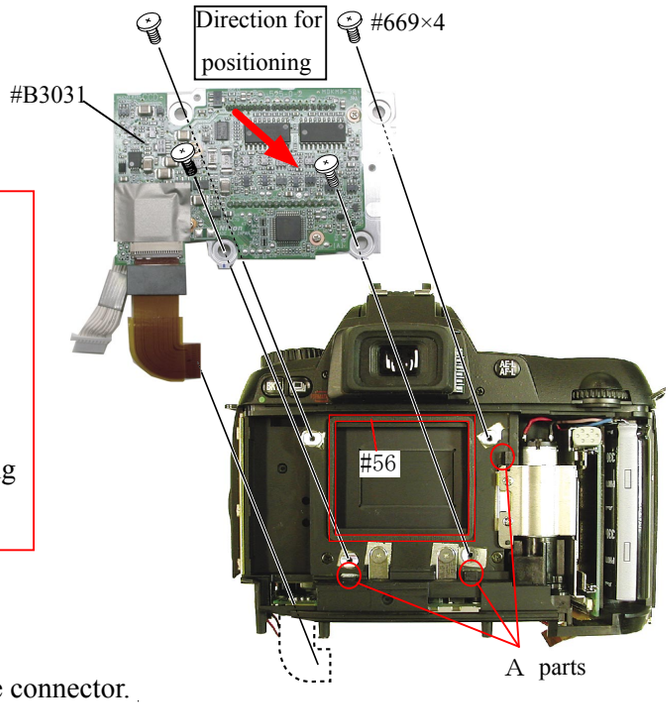
＊ Note: After the adjustment ends, arrange the connection FPC inside the cover.

CCD PCB unit

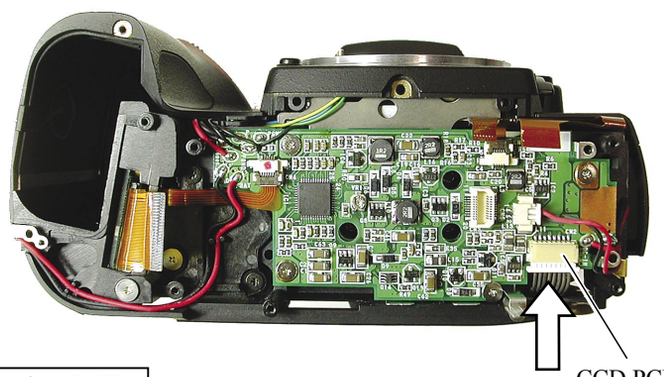
・Attach the CCD dust-proof seal (#56).
・Assemble the CCD PCB unit (#B3031) with 4 screws (#669).

＊ Note ① :
In case there are washers inserted between the rear body and the CCD PCB unit, follow the instructions of Page A24.

＊ Note ② :
In case spacers are attached at A parts of the rear body, mount the CCD PCB unit without removing them. （There is no indicatinon.）



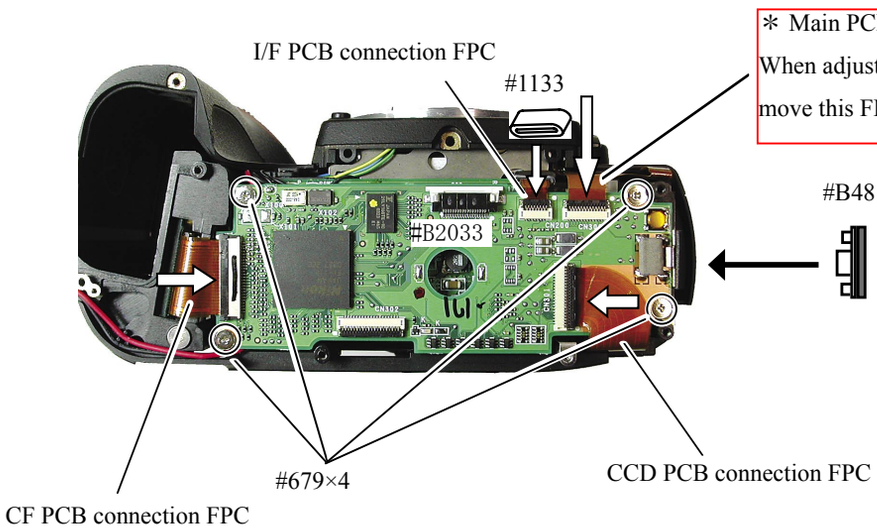
・Attach the CCD PCB connection harness to the connector.



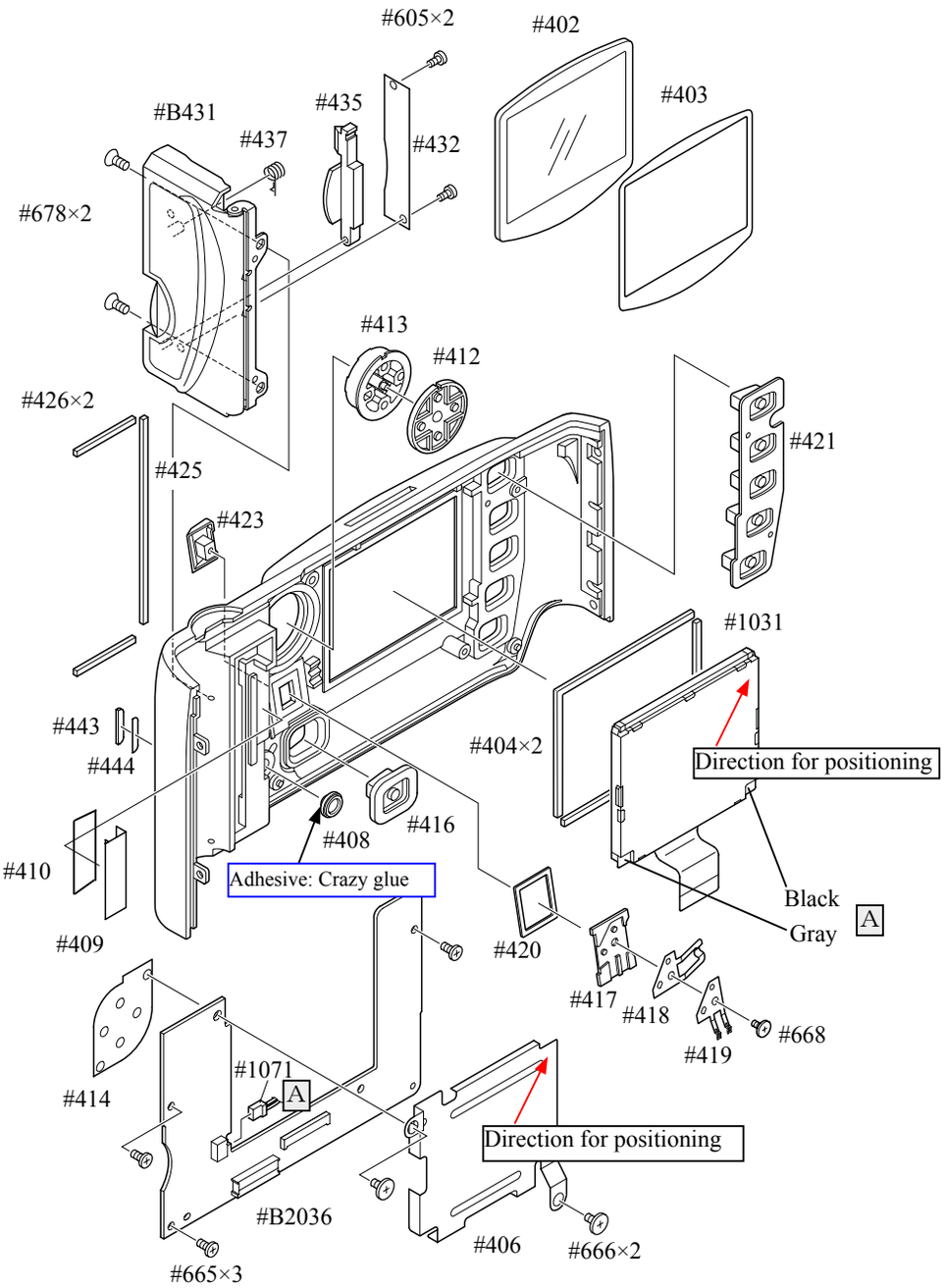
Memory compression PCB

・Assemble the memory compression PCB (#B2033) and attach it with 4 screws (#679).
・Attach the USB gasket (#B481) on the memory compression PCB.
・Put the ferrite core (#1133) on I/F PCB connection FPC.
・Connect the connection FPCs, which are connected from CF PCB, I/F PCB, main PCB, and CCD PCB to each connector.

＊ Main PCB connection FPC
When adjusting camera body, remove this FPC. ref. Page A36.

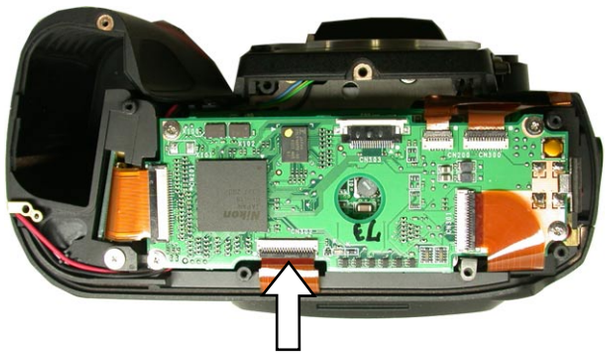


Rear cover



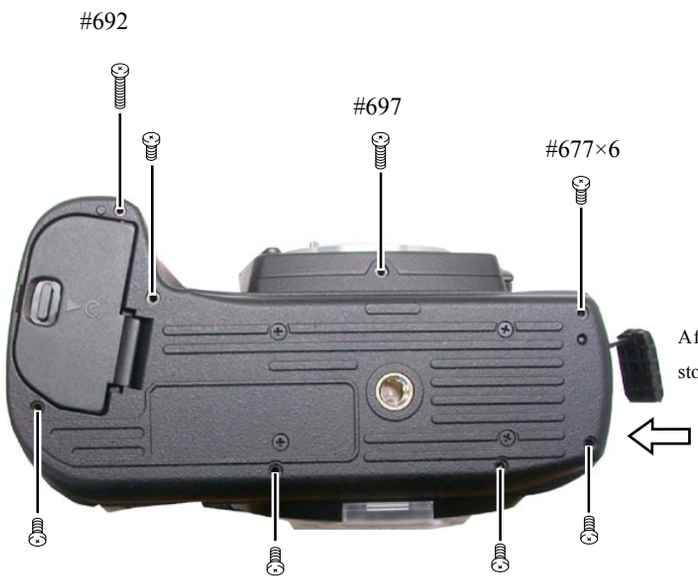
・Attach the rear cover with 4 screws (#612).

・Attach the TFT-PCB connection FPC to the connector.



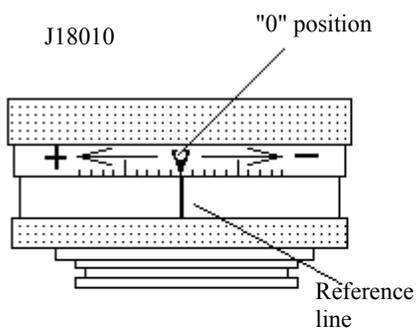
TFT-PCB connection FPC

Bottom cover



∞ Infinity alignment & adjustment

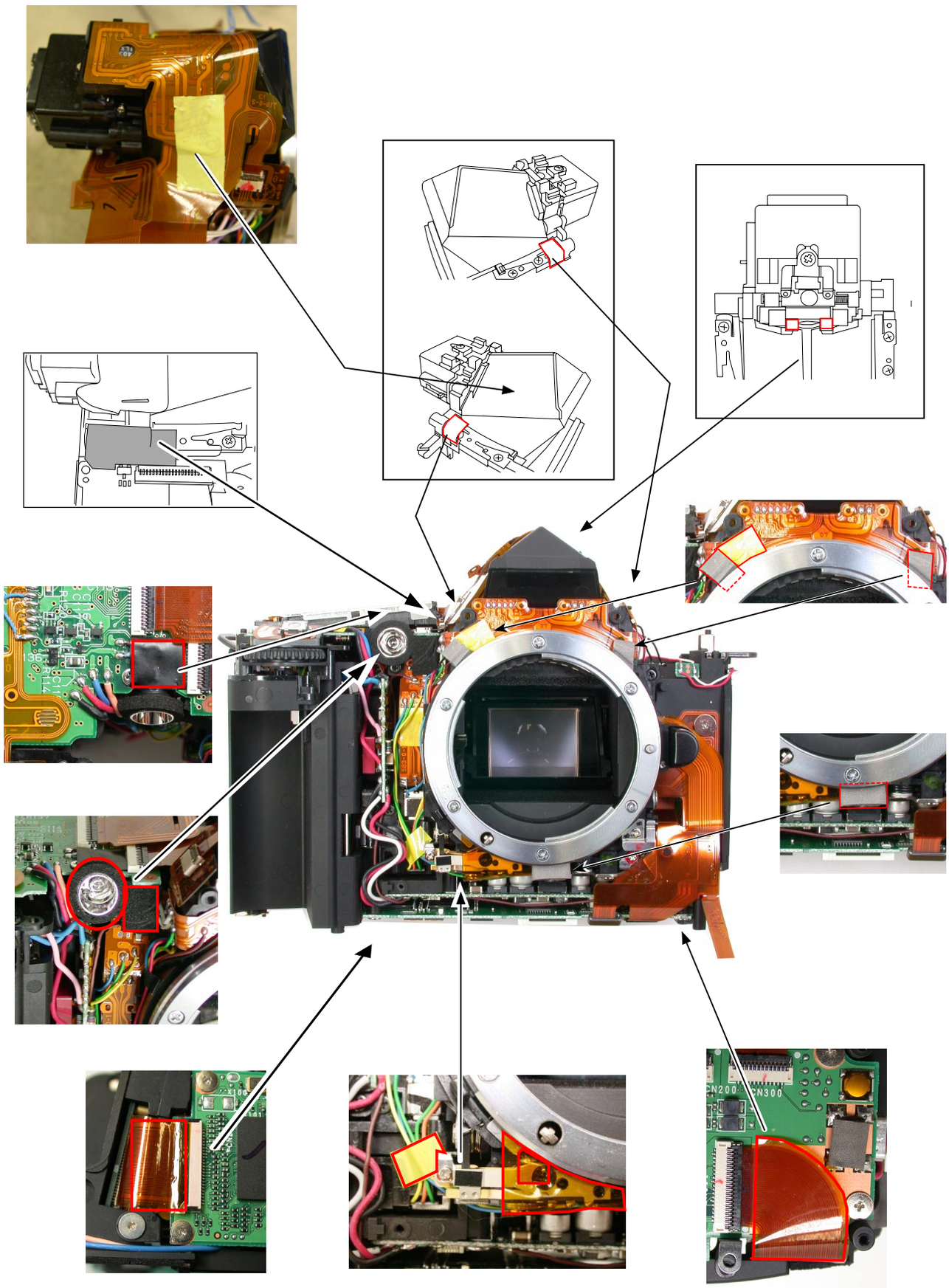
・Replace the finder screen with the infinity focus check screen (J15410), and use the reference lens (J18010) and read the value. In case it is out of standard, increase or decrease washers (#297A or#297B) for adjustments. * Supply the power (Battery or EH-5) for checking.



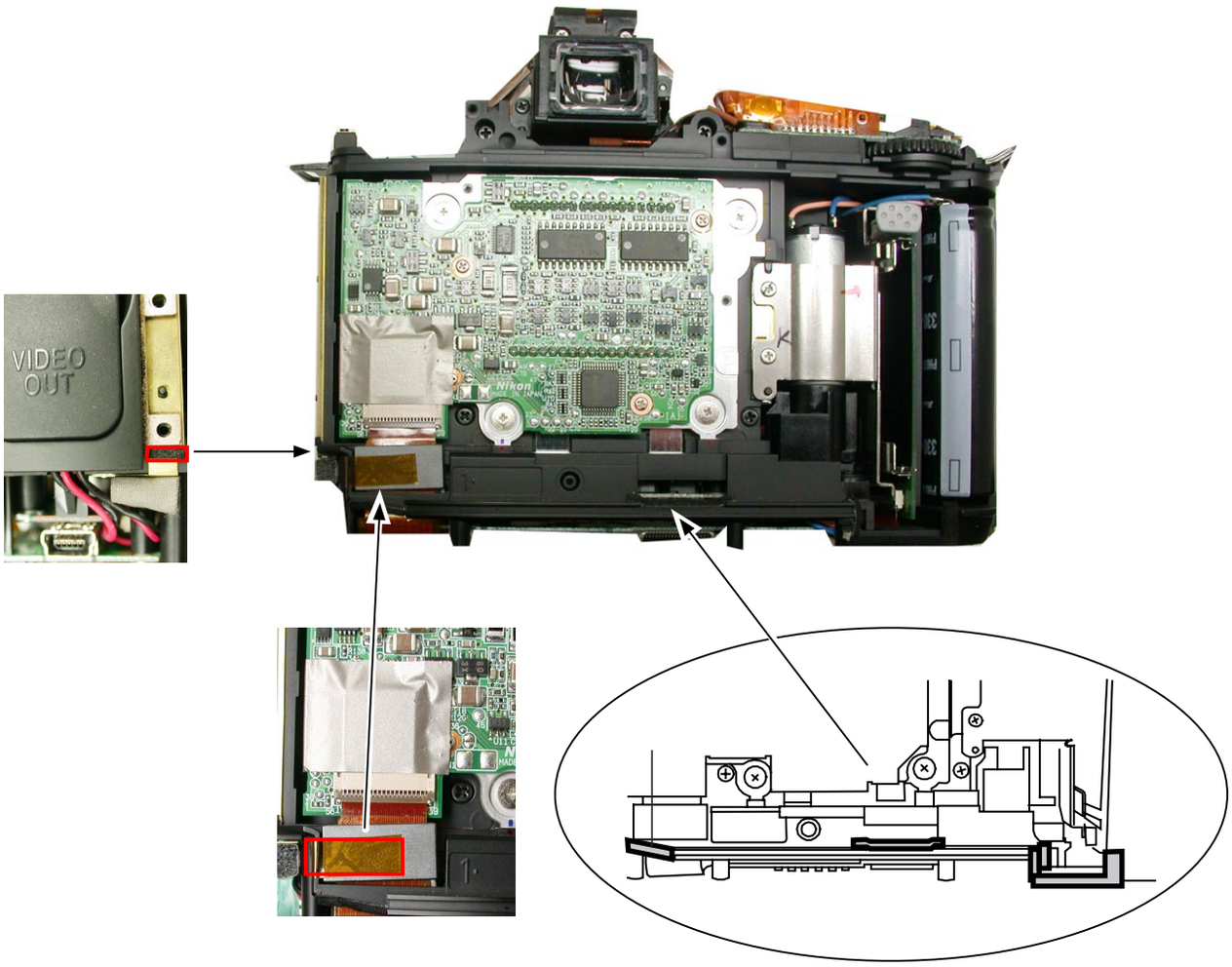
Standard: ±0.07mm (1 scale = 0.01mm)

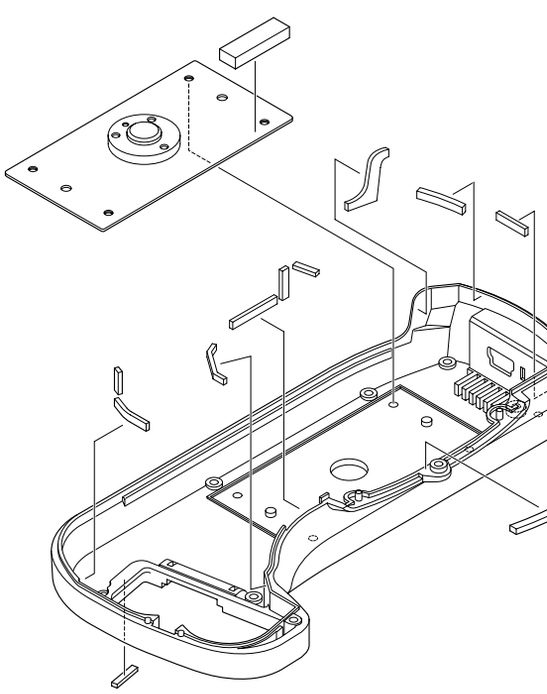
Value of J18010	Adjustment
+0.07 ～ -0.07	Adjustment unnecessary if within standard
+0.08 ～ +0.15	Decrease washers (#297) (for thinning)
-0.08 ～ -0.15	Increase washers (#297) (for thickening)
+0.15 or more; -0.15 or less	Check if Front body or Penta box is not deformed.

Other tapes/ sponges ①



Other tapes/ sponges ②





Necessary adjustments on PC when parts are replaced

1. Adjustment software

Adjustments of / Parts to be replaced	AE CCD position	AE accuracy	Aperture accuracy inspection	Adjustment for battery check level	Inspection and adjustment for built-in SB light volume	AF accuracy	EEPROM fixed values
Shutter unit							
Main FPC		○	○	○	○	○	○
AF sensor unit						○	
Top cover or SB lower case unit					○		
DC/DC PCB unit							
Metering FPC unit	○	○					
Aperture control PCB unit			○				

2. Shooting image adjustment software

Adjustments of / Parts to be replaced	Sensitivity	Gr/Gb compensation ADJ (R/B filter)	Sensitivity ratio	CCD black point defect compensation	CCD white point defect compensation	TFT view angle	CCD-PCB EEPROM Flash up	TFT EEPROM Flashram up
Shutter unit								
Main PCB unit								
AF sensor unit								
DC/DC PCB unit								
Metering FPC unit								
Memory compression PCB							○	○
CF PCB								
I/F PCB								
CCD PCB unit	○	○	○	○	○			
TFT PCB or TFT monitor						○		*○

*. Execute " TFT EEPROM Flash up" first, then adjust "TFT view angle".

Shooting Image Adjustment

1. Summary

When D70s shooting image-related, TFT display-related and listed parts on Page A47 are replaced, be sure to make an adjustment by the shooting image adjustment software for D70s (J65076). The details of its function and how to use this software are as follows:

2. Adjustment software function

(1) "Sensitivity" adjustment
(2) Gr/Gb compensation adjustment (R/B filter)
(3) "Sensitivity ratio" adjustment
(4) CCD black point defect compensation
(5) CCD white point defect compensation
(6) "Sensitivity" and "Sensitivity ratio" reference values calculation
(7) "TFT view angle" adjustment
(8) CCD-PCB EEPROM flashram up
(9) TFT-PCB EEPROM flashram up
(10) Reading of RISC version

※ When the memory compression PCB is replaced, perform the followings: Flashram up of EEPROM value of the CCD-PCB, Flashram up of EEPROM value of the TFT-PCB.

※ When the adjustments from (1) to (3) are made, calculate the sensitivity and sensitivity ratio reference values of (6) by using the reference body in advance, then perform the adjustments.

3. Hardware requirements

OS： Widows98SE, Windows2000, WindowsME, WindowsXP
Japanese or English OS

PC： CPU Pentium Ⅱ or more
Memory 128MB or more
USB1.1

Screen size: 1024×768 pixels or more

4. How to set up

Create any directory in the harddisc of PC, and copy the following files.

・D70IMG.exe・・・・・・・・・Application file
・STD.DAT・・・・・・・・・・Standard file
・NkdPTP.dll・・・・・・・・・・USB-communication application extension file for WinXP
・NkdPTPDi.dll・・・・・・・・・USB-communication application extension file for Win98SE, Win2K, WinME

※ Be sure to copy the above files in the same directory.

5. Install USB driver

When this software is used, USB driver becomes necessary. However, USB-driver installation is not needed if USB driver has already been installed at the time of installing "D70s inspection and adjustment program". As for WindowsXP, the installation is neither needed, because it is already included in OS.

6. How to use

(1) Perform the D70sIMG.exe to start up the main screen. (ref. Fig.1)
(2) Select ENGLISH / JAPANESE in Language to display the expected menu. (ref. Fig.2)
(3) Click the desired button to start adjustments.
※ When the adjustments from 1. to 3. are made, calculate to get the "Sensitivity" and "Sensitivity ratio" reference values of (7) by using the reference body beforehand, then perform the adjustments.
(4) Follow the instructions to be displayed on screen.
(5) To complete the procedure, click "QUIT" button or "Close" button at the upper-right corner of the menu.

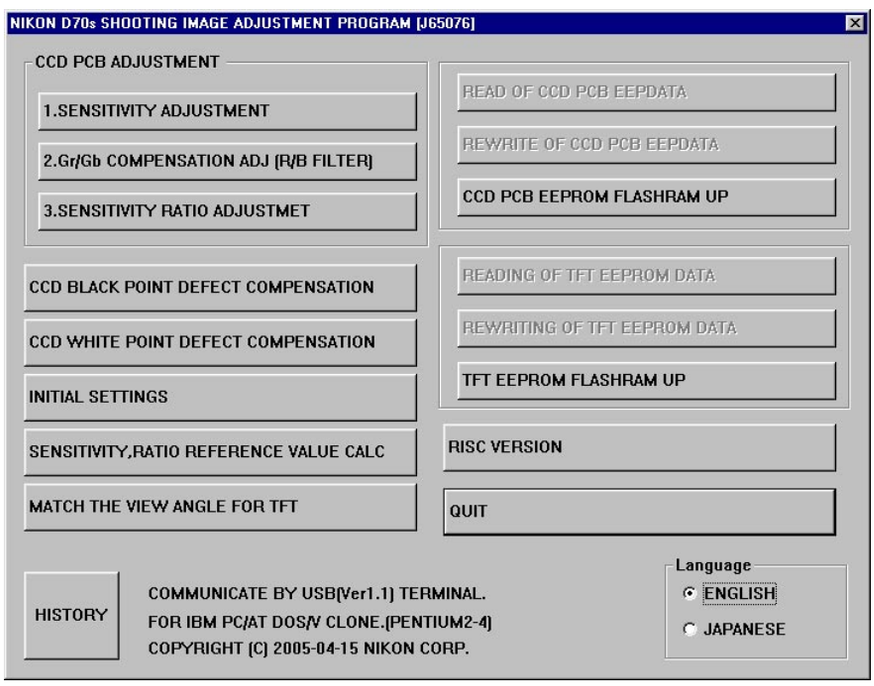


Fig.1

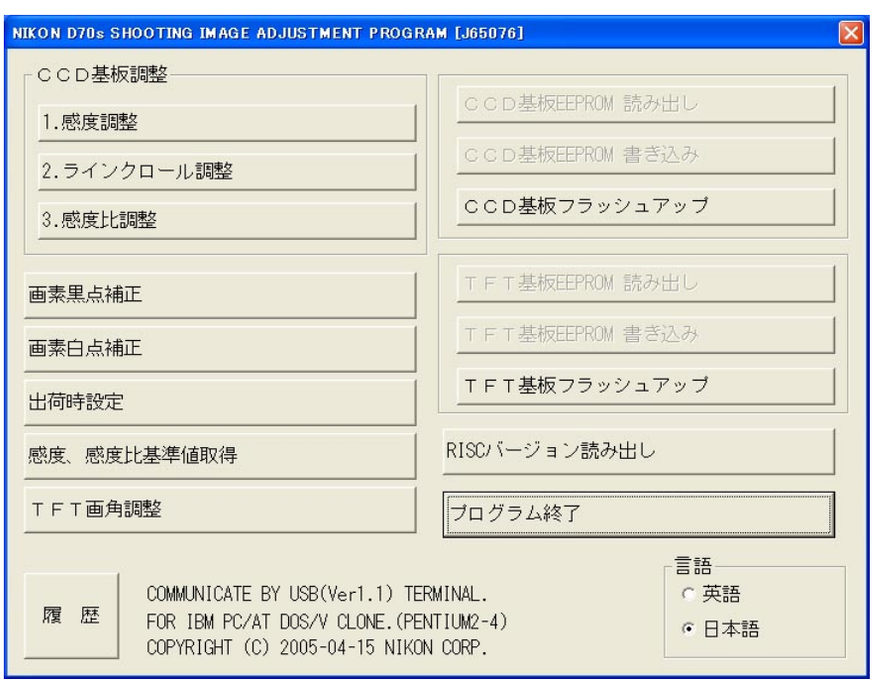


Fig.2

7. Required equipment and conditions

※ AC adapter EH-5 and USB cable (mini B type) UC-E4 are used for all adjustments so they are not specified in the list.

★ New established tool

	Item	Required equipment	Setting/Remarks
1	Sensitivity adjustment	・5100K color viewer J63070 (ex-model viewer J63049 is also available.) ・Luminance meter BM-3000 J63068 ・Tool lens (to fix aperture) J61185 ・ND filter (ND8×1+ND4×2)	Equivalent to luminance LV13 Aperture F8 52 mm,7-step light reduction; Use the packaged product
2	Gr/Gb compensation adjustment (R/B filter)	・5100K color viewer J63070 (ex-model viewer J63049 is also available.) ・Luminance meter BM-3000 J63068 ・Tool lens (Fixed aperture) J61185 ・SP3 (R filter) J63087 ・SP1 (B filter) J63085	Equivalent to luminance LV13 Aperture F8
3	Sensitivity ratio adjustment	・5100K color viewer J63070 (ex-model viewer J63049 is also available.) ・Luminance meter BM-3000 J63068 ・Tool lens (to fix aperture) J61185	Equivalent to luminance LV13 Aperture F8; No filter
4	CCD black point defect compensation	・5100K color viewer J63070 (ex-model viewer J63049 is also available.) ・Luminance meter BM-3000 J63068 ・Tool lens (to fix aperture) J61185	Equivalent to luminance LV13 Aperture F5.6
5	CCD white point defect compensation	Body cap or lens cap	Environmental temperature approx. 20 - 25℃
6	Sensitivity, sensitivity ratio reference value calculation	Same as "Sensitivity adjustment"	No filter when sensitivity ratio reference value is calculated.
7	TFT view angle adjustment	None	Only for NTSC (unnecessary for PAL)
8	CCD PCB EEPROM flashram up	None	
9	TFT PCB EEPROM flashram up	None	
10	Reading of RISC version	None	

8. Summary

The summary on each adjustment is as follows:

(1) Sensitivity adjustment

Face the camera to the color viewer of LV13 equiv. putting the ND filter (-7 step) between them, and make an adjustment by changing the ampgain so that G output can fall in the standard range. Adjust the gain value so that the G output average value (Average of Gr/Gb) in the center (300×300 pixels) can reach the target output level (approx. 600LSB). The actual adjustment of the gain value is made only under the condition of ISO200 and ISO1600, and the medium sensitivity is calculated by the adjustment values of these 2 conditions.

For target output level, use the G output average of sensitivity reference value (ISO200) that was calculated by the reference body.

(2) Gr/Gb compensation adjustment (R/B filter)

Face the camera to the light-emitting box (color viewer) of LV13 equiv. putting the SP3 (R filter)/SP1 (B filter) between them, and make an adjustment so that the output difference in G output average between G-B line and G-R line when the whole screen is divided into areas can fall in the standard range.

(3) Sensitivity ratio adjustment

Face the camera to the color viewer of LV13 equiv., and make an adjustment so that the R/G, B/G output becomes the same as the output ratio of the sensitivity ratio reference value that was calculated by the reference body. Adjust only under the condition of ISO200, and use the average value of the center (300 pixels × 300 pixels).

(4) CCD black point defect compensation

When pixels of which the output level is under specified value with LV13 equiv., are detected, rewrite the coordinates of the detected pixels as pixel defect compensation data.

(5) CCD white point defect compensation

Take a shot on the dark surface. In case the pixel output is found to be beyond the standard value, store the detected pixel coordinate as the pixel defect compensation data.

(6) "Sensitivity" and "Sensitivity ratio" reference values calculation

・Sensitivity reference value calculation

By using the reference body, face the camera to the color viewer of LV13 equiv. putting the ND filter (-7 step) between them. Then, store the G output average value of the center (300 pixels × 300 pixels) in the STD.DAT file as the sensitivity reference value.

・Sensitivity ratio reference value calculation

By using the reference body, face the camera to the color viewer of LV 13 equiv. (without filter). Then, calculate the sensitivity ratio reference value GR and GB based on the G/R/B output average of the center (300 pixels × 300 pixels), and store them in the STD.DAT file.

It is necessary to calculate the reference values of "Sensitivity" and "Sensitivity ratio" in order to prevent the color temperature fluctuation caused by color viewer's changes over time from affecting the results of the shooting image adjustment. By using the reference body, calculate the reference values once in about every 3 months, when the fluorescent of the color viewer is replaced.

(7) TFT view angle adjustment

This is for adjusting the display position of TFT. Make an adjustment only for NTSC. (Unnecessary for PAL)

(8) CCD-PCB EEPROM flashram up

Copy the EEPROM value of the CCD-PCB into the flash memory of the memory compression PCB (AK PCB).

The flashram up is necessary when the memory compression PCB (AK PCB) is replaced.

The shooting image-related adjustment values are stored in EEPROM of the CCD-PCB, but the camera does not directly access the CCD-PCB EEPROM. It does read out the value, which is stored in the flash memory of the AK PCB of the memory compression PCB, and go to RAM to operate. Therefore, to reflect the adjustment value, it is necessary to copy the stored value of the CCD-PCB EEPROM into the flash memory.

※ When the shooting image adjustments of each (1) - (3) are completed, the software automatically performs the flashram-up.

(9) TFT PCB EEPROM flashram up

Copy the EEPROM value of the TFT PCB, as performed in the above CCD-PCB, into the flash memory.

It is necessary to flashram up when the TFT PCB is replaced.

※ When the TFT view angle adjustment is completed, the software automatically performs the flashram-up.

(10) Reading of RISC version

Display the RISC firmware version.

9. Procedure

9-1. Shooting image adjustment

- Calculate the "Sensitivity" and "Sensitivity ratio" reference values by using the reference body beforehand, then perform the adjustments. (ref. 9-4.)
- For the shooting image adjustment from (1) to (3), perform all of them in this order. The adjustments from (1) through (3) are all programmed to be executed in serial order. When (1) is completed, the software automatically goes on to the next adjustment.
- In case adjustments are interrupted by NG, it is possible to continue the adjustments again after NG. As for adjustments that were ended with OK, the storage of adjustment values into EEPROM and the flashram-up are completed.

＊ Note: Adjustments are not possible without resetting "Custom setting" of this camera.
Before the adjustments, record the details of "Custom setting" set by customers if necessary.
You can use [D70 reference body] as [D70s reference body].

Start adjustments

・Provide the power for the camera via AC adapter.
・Reset "Custom setting".
・Set "PTP" mode by Setup menu.
・Set the focus mode to M, exposure mode to M, and the exposure compensation to ″0″ of the camera.
・Connect the camera and PC via USB cable.
・Set the color viewer luminance to LV13 equiv.

(1) Sensitivity adjustment
・Click "SENSITIVITY ADJUSTMENT" of the main menu on screen.
・Attach the tool lens (Aperture F8) and ND filter (ND 8× 1+ ND 4 ×2） to the camera.
・Get the camera closest to the center of the illuminated surface of the color viewer.
・The adjustment starts. When it is completed, "OK" is displayed.
・The software automatically goes on to the next adjustment item.

(2) CCD Gr/Gb compensation adjustment (R/B filter)
・Click "Gr/Gb COMPENSATION ADJ (G FILTER)" on the menu.
・Attach the tool lens (Aperture F8) and SP3 (R filter) to the camera.
・Get the camera closest to the center of the illuminated surface of the color viewer.
・The adjustment starts. When it is completed, the next instructions are displayed.
・Attach the tool lens (Aperture F8) and SP1 (B filter) to the camera.
・Get the camera closest to the center of the illuminated surface of the color viewer.
・The adjustment starts. When it is completed, "OK" is displayed.
・The software automatically goes on to the next adjustment.

(3) Sensitivity ratio adjustment
・Click "SENSITIVITY ADJUSTMENT" of the main menu on screen.
・Attach the tool lens (Aperture F8) to the camera (without filter).
・Get the camera closest to the center of the illuminated surface of the color viewer.
・The adjustment starts. When it is completed, "OK" is displayed.

9-2. Pixel defect (black spots) compensation

- Set the color viewer luminance to LV13 equiv.
- Provide the power for the camera via AC adapter.
- Reset "Custom setting".
- Set "PTP" mode by Setup menu.
- Set the focus mode to M, exposure mode to M, and the exposure compensation to ″0″ of the camera.
- Connect the camera and PC via USB cable.
- Click "CCD BLACK POINT DEFECT COMPENSATION" of the menu on screen.
- Attach the tool lens (Aperture F5.6) to the camera (without filter).
- Get the camera closest to the center of the illuminated surface of the color viewer.
- When the adjustment starts, pixel defects are detected, displaying the number of pixels and addresses.
- After confirming the above, click "X" button.
- When it is completed, "OK" is displayed.

＊ Note: In some cases, NG occurs due to dusts on the CCD.
Be sure to clean the CCD surface before adjustments.

9-3. Pixel defect (white spots) compensation

- Check the environmental temperature (approx. 20-25°C.).
- Provide the power for the camera via AC adapter.
- Reset "Custom setting".
- Set "PTP" mode by Setup menu.
- Set the focus mode to M, exposure mode to M, and the exposure compensation to ″0″ of the camera.
- Connect the camera and PC via USB cable.
- Click "CCD WHITE POINT DEFECT COMPENSATION" of the menu on screen.
- Cap the camera with the body cap or lens cap to shield light from the mount.
- When the adjustment starts, pixel defects are detected, displaying the number of pixels and addresses.
- After confirming the above, click "X" button.
- When it is completed, "OK" is displayed.

9-4. Sensitivity ratio reference value calculation

- Set the color viewer luminance to LV13 equiv.
- Provide the power for the camera via AC adapter.
- Reset "Custom setting".
- Set "PTP" mode by Setup menu.
- Set the focus mode to M, exposure mode to M, and the exposure compensation to ″0″ of the camera.
- Connect the camera and PC via USB cable.
- Select "SENSITIVITY, RATIO REFERENCE VALUE CALC" of the menu on screen.
- The current reference value is displayed on screen.
- Click "SENSITIVITY, RATIO REFERENCE VALUE CALC".
- The calculation of the sensitivity reference value starts. The message to set conditions is displayed.
- Attach the tool lens (Aperture F8) and ND filter (ND 8× 1 ＋ ND 4 ×2） to the camera.
- Get the camera closest to the center of the illuminated surface of the color viewer.
- The adjustment starts. When it is completed, the software goes on to the sensitivity ratio reference value.
- Attach the tool lens (Aperture F8)(Remove ND filter).
- The adjustment starts. When it is completed, the sensitivity and sensitivity reference values are stored in the standard setting file (STD, DAT).
- After this procedure, when the shooting image adjustment is made, the sensitivity and sensitivity ratio that were calculated this time are used.

※ Calculate the sensitivity and sensitivity ratio reference values once in about every 3 months, and when the fluorescent of the color viewer is replaced.

9-5. "TFT view angle" adjustment (only for NTSC; unnecessary for PAL)

- Provide the power for the camera via AC adapter.
- Set "PTP" mode by Setup menu.
- Connect the camera and PC via USB cable.
- Click "TFT VIEW ANGLE ADJUSTMENT" of the menu on screen.
- When the adjustment starts, a frame appears in the LCD area of camera.
- By clicking the "Left", or "Right", or "Up" or "Down" buttons on the window, move the frame from right to left or up and down to prevent the frame from running off the edge of the TFT monitor of the camera.

9-6. CCD-PCB EEPROM flashram up

- Provide the power for the camera via AC adapter.
- Set "PTP" mode by Setup menu.
- Connect the camera and PC via USB cable.
- Click "CCD PCB EEPROM FLASHRAM UP" of the menu on screen.
- The adjustment starts. When it is completed, "OK" is displayed.

9-7. TFT-PCB EEPROM flashram up

- Provide the power for the camera via AC adapter.
- Set "PTP" mode by Setup menu.
- Connect the camera and PC via USB cable.
- Click "TFT PCB EEPROM FLASHRAM UP" of the menu on screen.
- The adjustment starts. When it is completed, "OK" is displayed.

9-8. Reading of RISC version

- Provide the power for the camera via AC adapter.
- Set "PTP" mode by Setup menu.
- Connect the camera and PC via USB cable.
- Click "READING OF RISC VERSION" of the menu on screen.
- RISC version is displayed.

10. Procedure for upgrading RISC firmware:

- After preparing the CF card, copy the latest version (XXXX. BIN) into the root directory.
- Insert the CF card, and select "FIRMWARE VERSION" from the SETUP menu.
- Follow the instructions on screen for version upgrading. It takes approx. 3-4 minutes.
- Check the version of firmware by "RISC VERSION" of the image adjustment software.

Note:

In case incorrect files are included in the CF card, the details for upgrading are not displayed even after selecting "FIRMWARE VERSION" from the SETUP menu.

ELECTRICITY

Memory Compression PCB Block Diagram	E1
Wiring Diagram	E2
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Sub PCB (Surface)	E5
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AF CCD FPC	E10
External LCD FPC	E11
Top Cover FPC	E12
Metering FPC	E13
Front Body FPC	E14
SI FPC	E15
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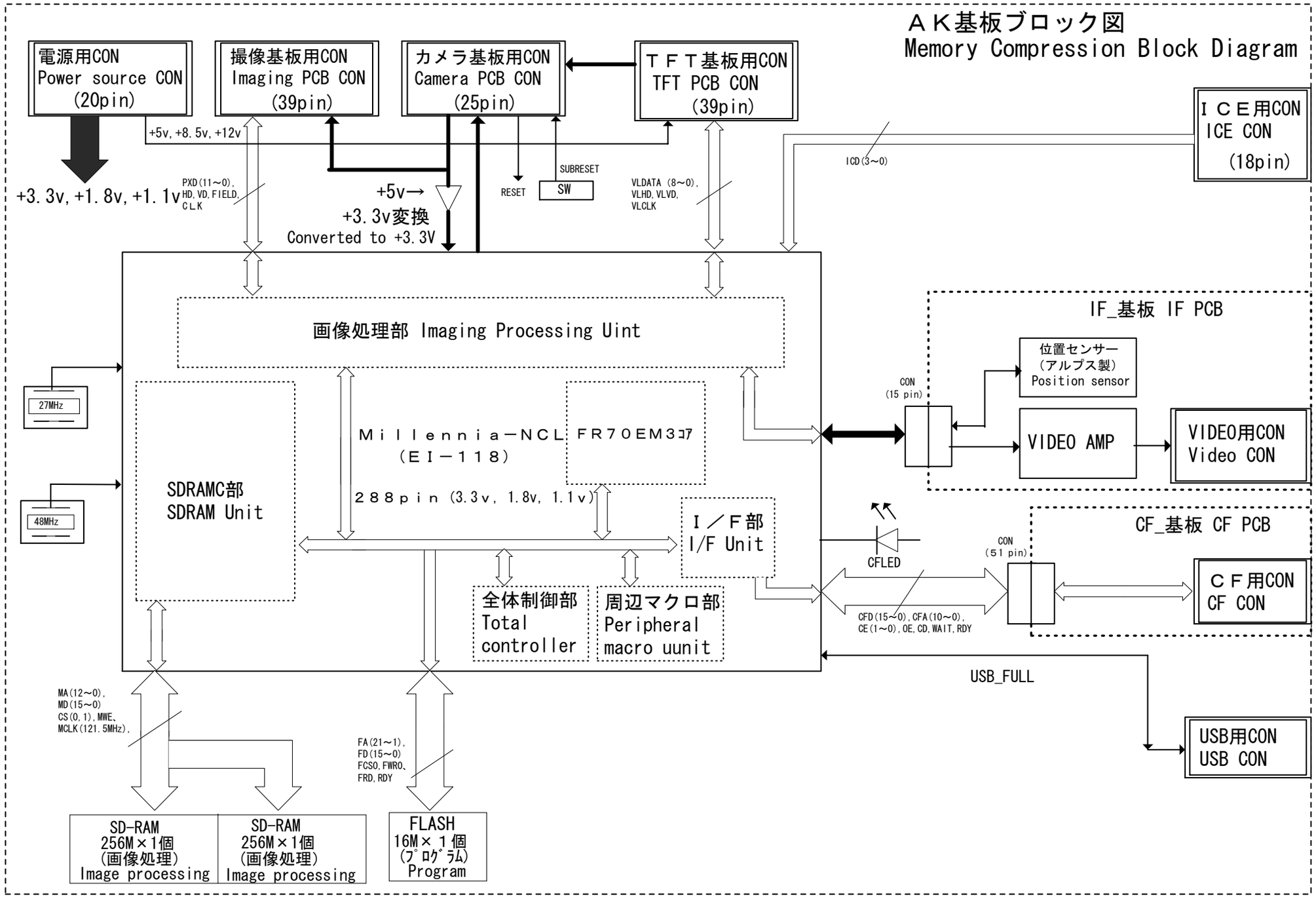
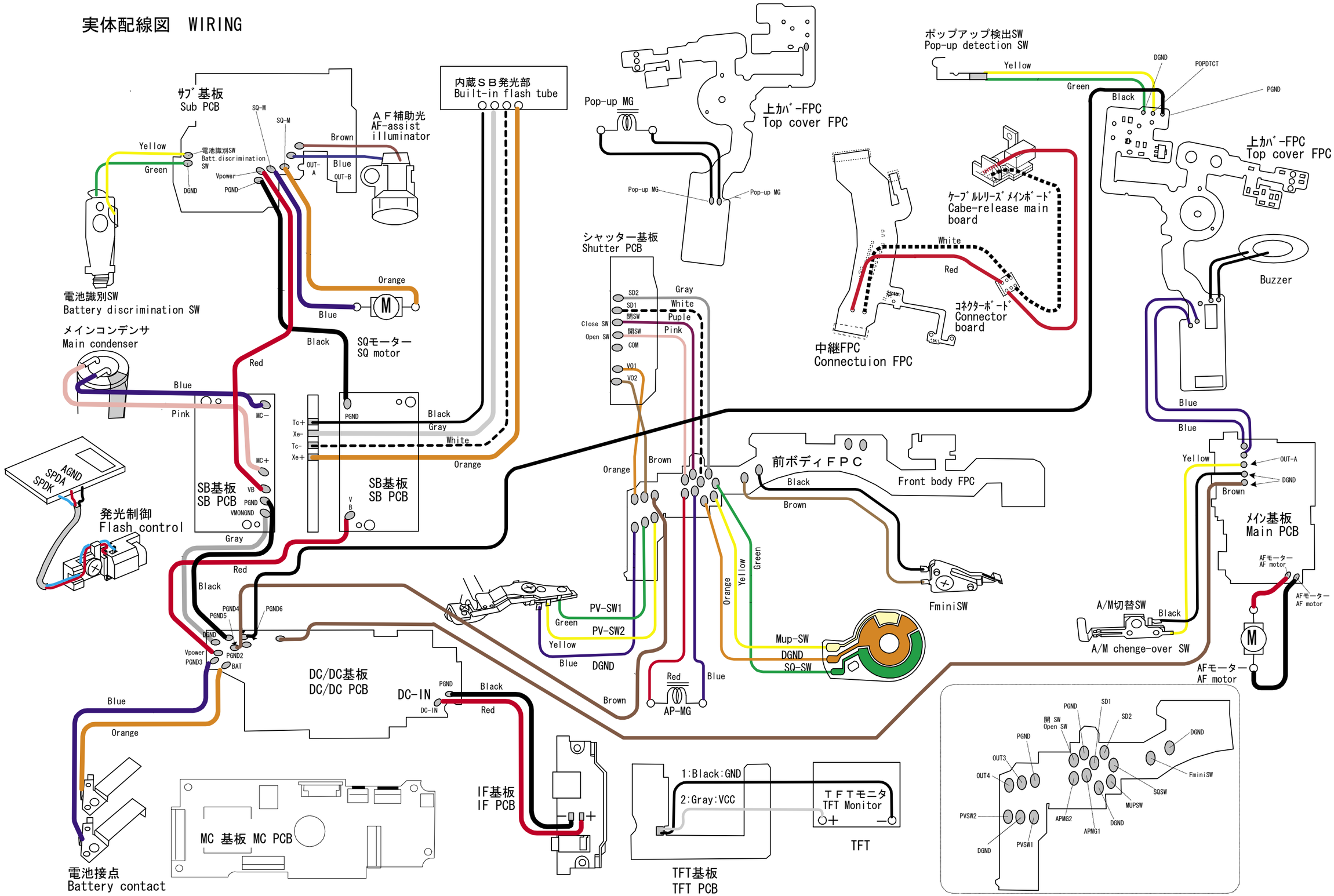
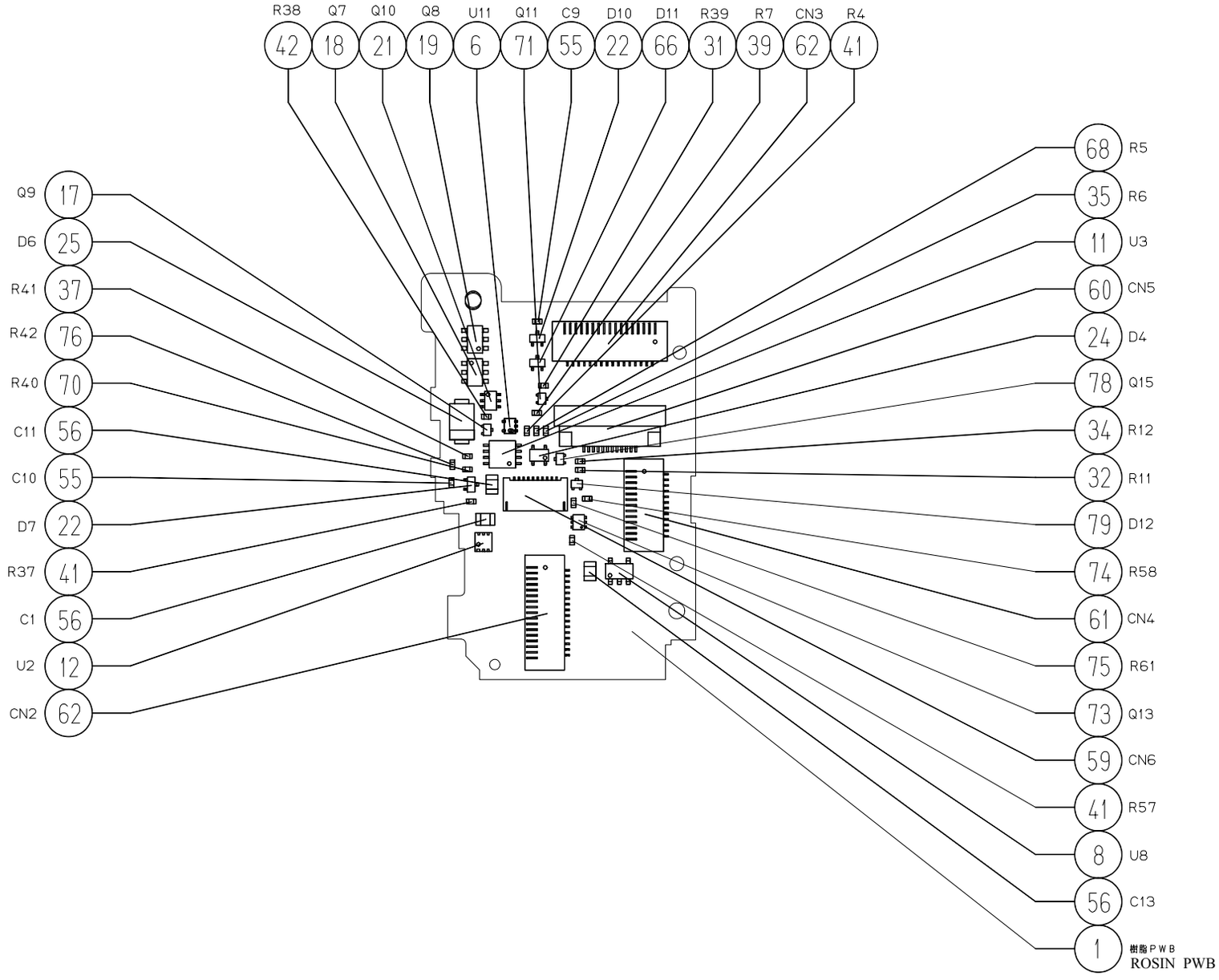
CCD PCB (Reverse)	E17
Memory Compression FPC (Surface)	E18
Memory Compression FPC (reverse)	E19
CF PCB	E20
IF PCB	E21
TFT PCB (Surface)	E22
TFT PCB (Reverse)	E23
DC-DC Converter (Surface)	E24
DC-DC Converter (Reverse)	E25


ＡＫ基板ブロック図
Memory Compression Block Diagram
電源用CON
Power source CON
(20pin)
撮像基板用CON
Imaging PCB CON
(39pin)
カメラ基板用CON
Camera PCB CON
(25pin)
ＴＦＴ基板用CON
TFT PCB CON
(39pin)
ＩＣＥ用CON
ICE CON
(18pin)
+5v, +8.5v, +12v
+3.3v, +1.8v, +1.1v
PXD(11～0), HD, VD, FIELD, CLK
+5v→
+3.3v変換
Converted to +3.3V
RESET
SUBRESET
SW
VLDATA (8～0), VLHD, VLVD, VLCLK
ICD(3～0)
画像処理部 Imaging Processing Uint
IF_基板 IF PCB
位置センサー
(アルプス製)
Position sensor
CON
(15 pin)
VIDEO AMP
VIDEO用CON
Video CON
27MHz
48MHz
SDRAMC部
SDRAM Unit
Ｍｉｌｌｅｎｎｉａ－ＮＣＬ
（ＥＩ－１１８）
ＦＲ７０ＥＭ３ｼﾘｰｽﾞ
２８８ｐｉｎ (3.3v, 1.8v, 1.1v)
Ｉ／Ｆ部
I/F Unit
CFLED
CON
(51 pin)
CF_基板 CF PCB
ＣＦ用CON
CF CON
CFD(15～0), CFA(10～0), CE(1～0), OE, CD, WAIT, RDY
全体制御部
Total
controller
周辺マクロ部
Peripheral
macro uunit
USB_FULL
USB用CON
USB CON
MA(12～0), MD(15～0) CS(0,1), MWE, MCLK(121.5MHz),
FA(21～1), FD(15～0) FCS0, FWR0, FRD, RDY
SD-RAM
256M×1個
(画像処理)
Image processing
SD-RAM
256M×1個
(画像処理)
Image processing
FLASH
16M×１個
(ﾌﾟﾛｸﾞﾗﾑ)
Program

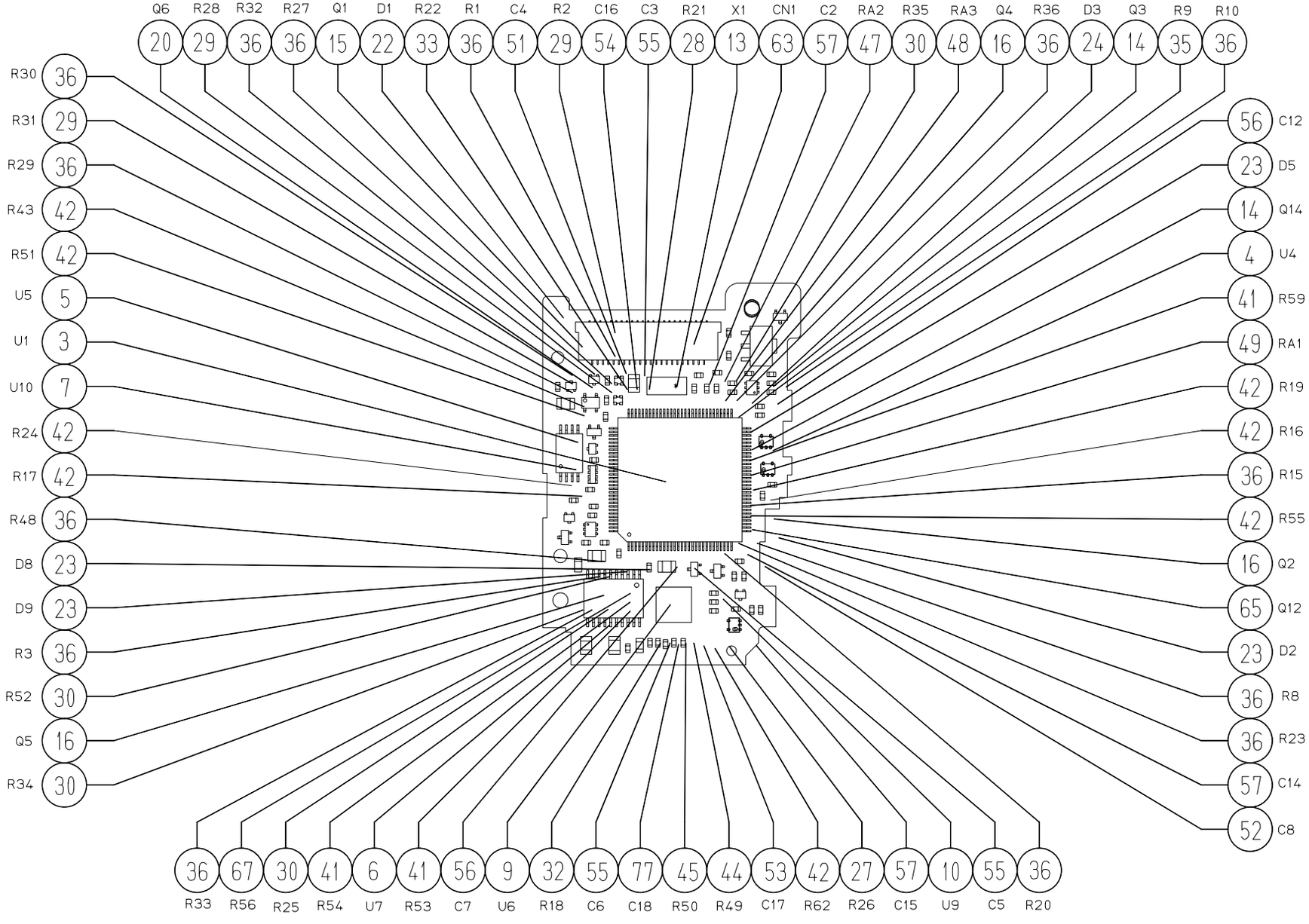
実体配線図　WIRING



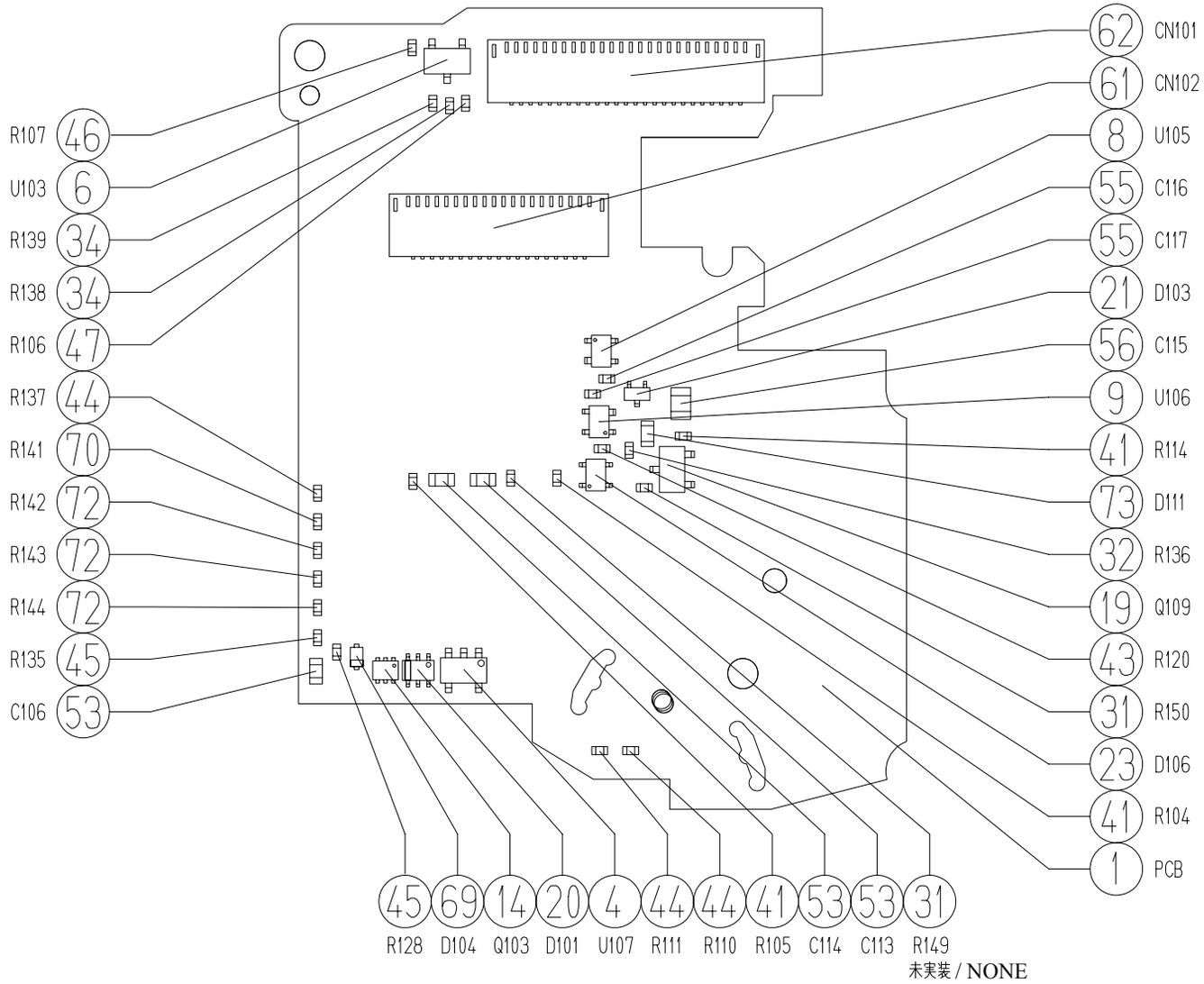
メイン基板（表）
Main PCB (Surface)



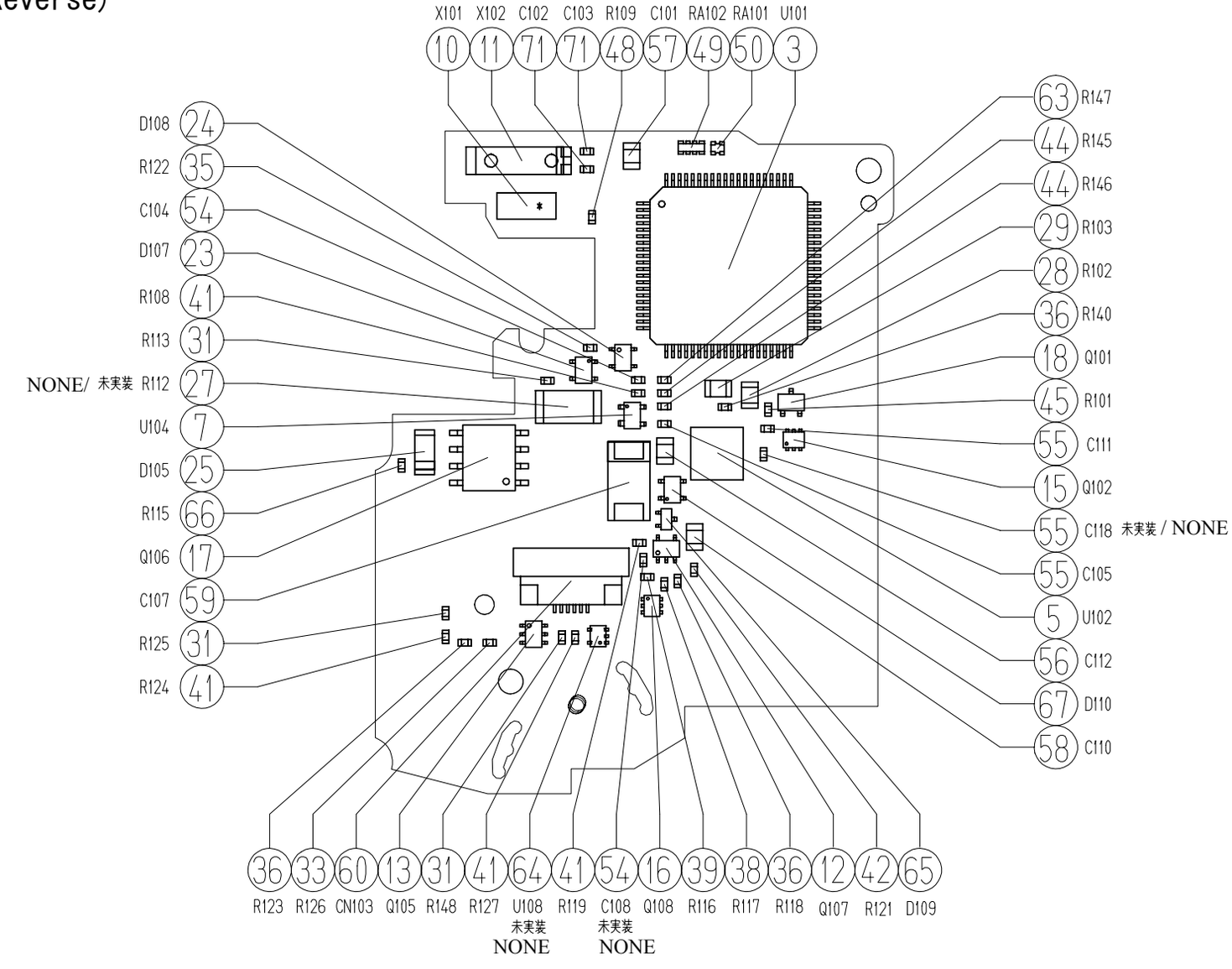
メイン基板（裏）
Main PCB (Reverse)



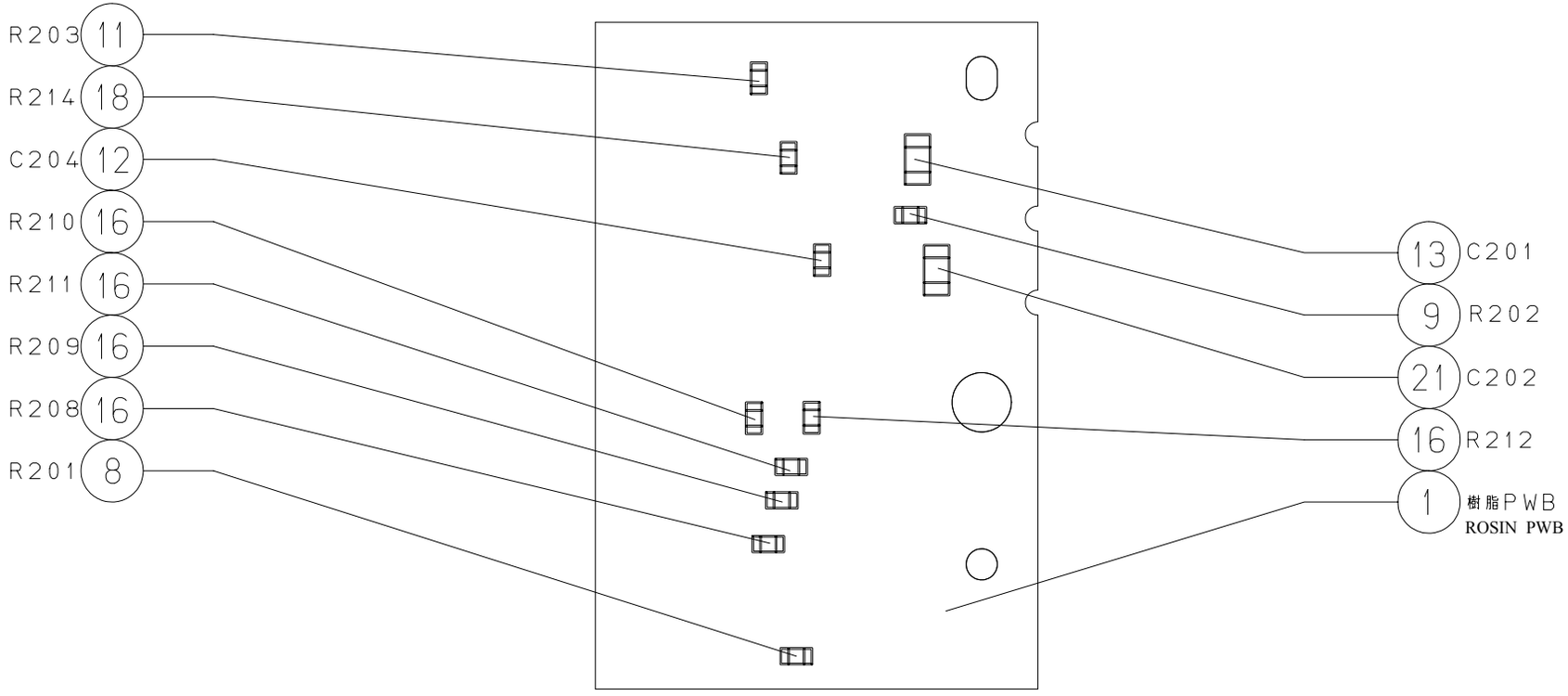
サブ基板（表）
Sub PCB (Surface)



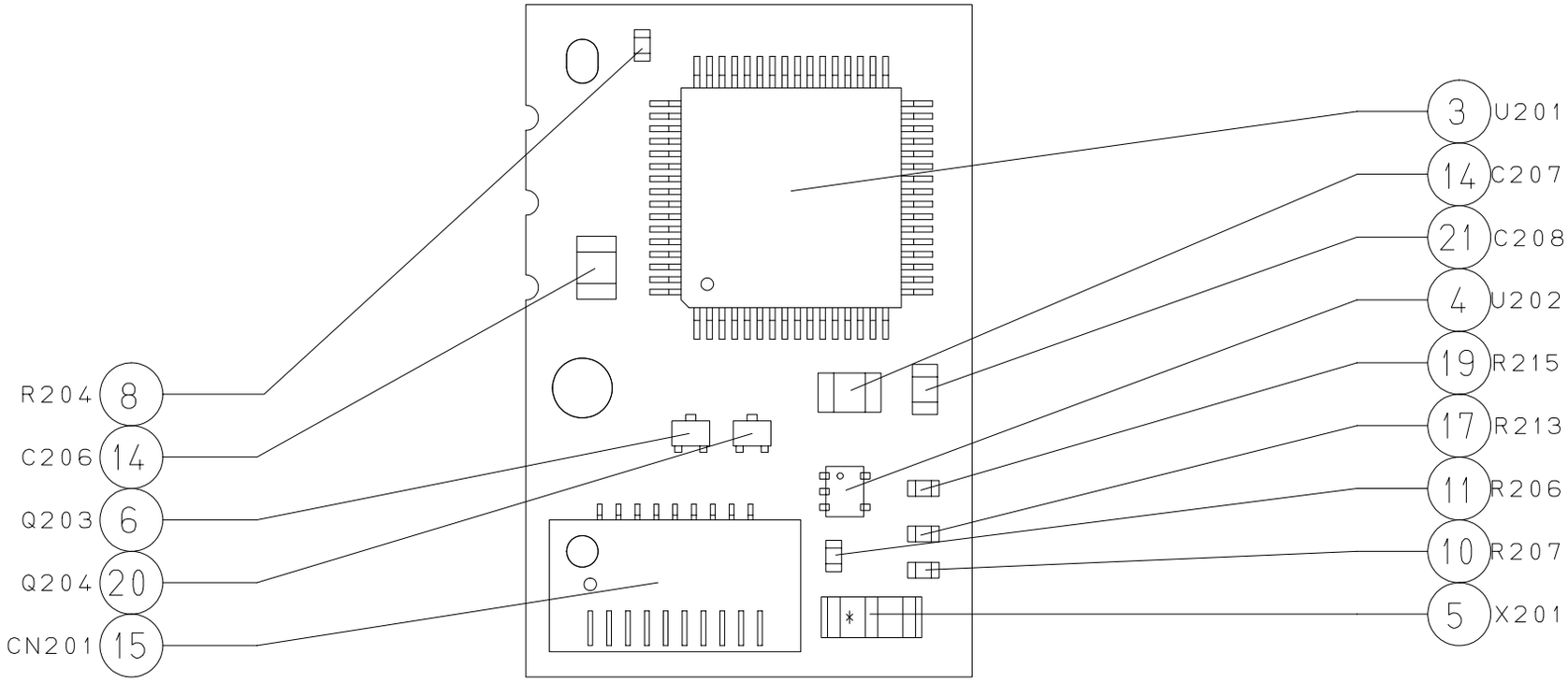
サブ基板（裏）
Sub PCB (Reverse)



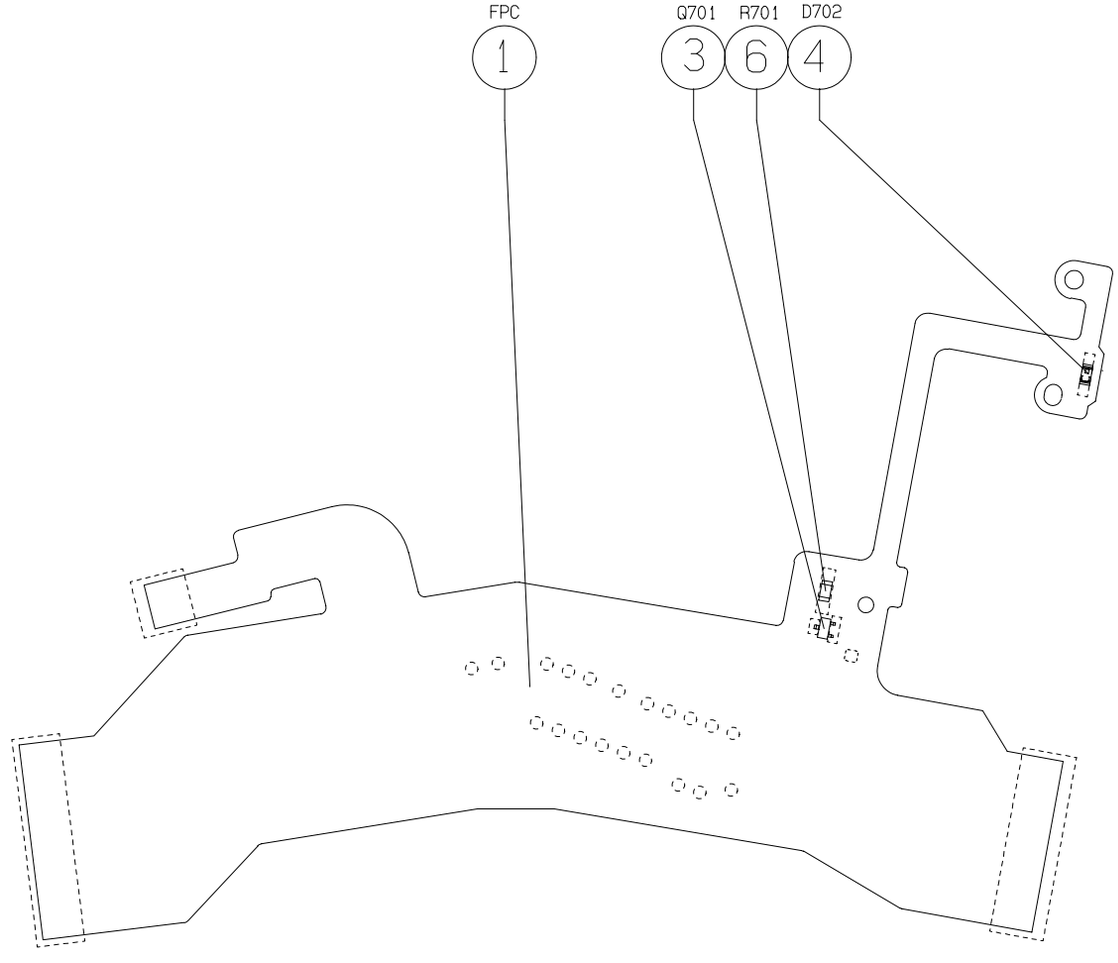
発光制御基板（表）
Flash Control PCB (Surface)



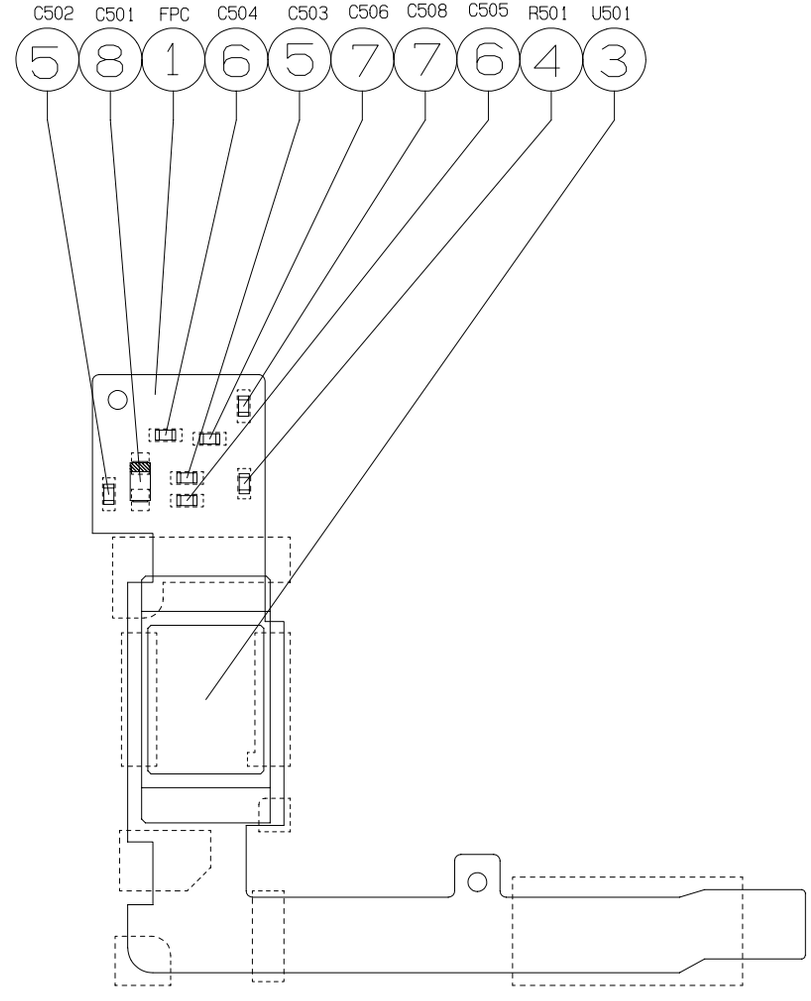
発光制御基板（裏）
Flash Control PCB (Reverse)



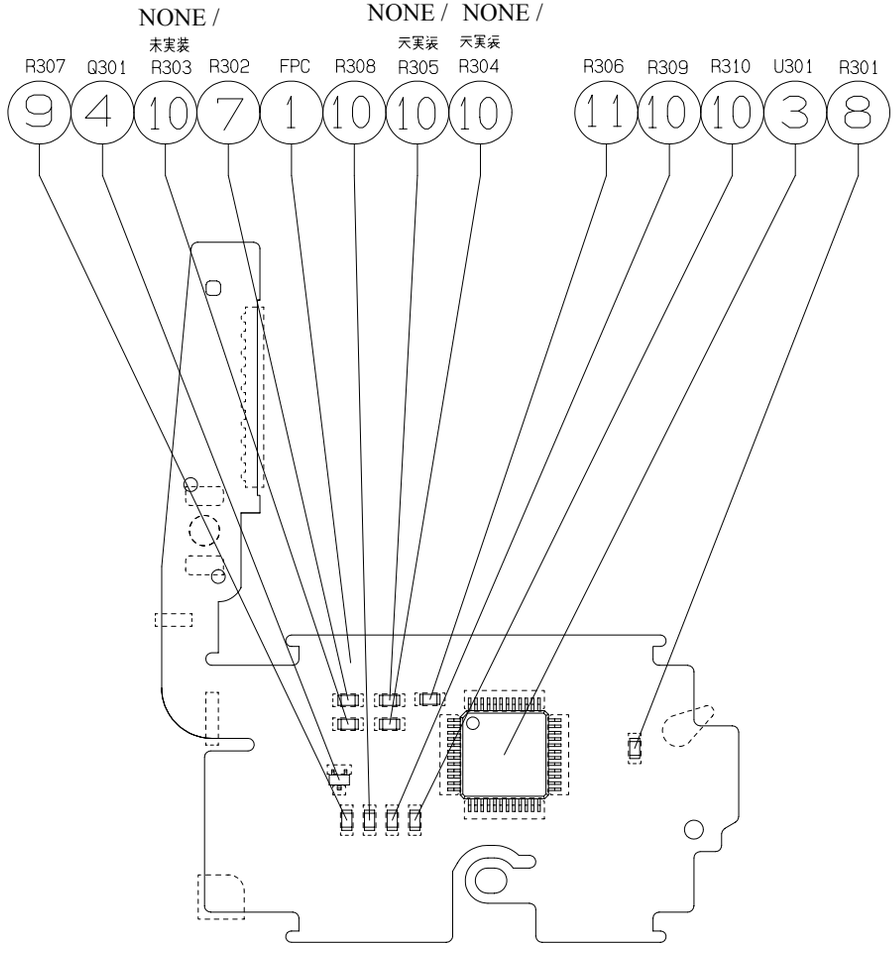
中継ＦＰＣ
Connection FPC

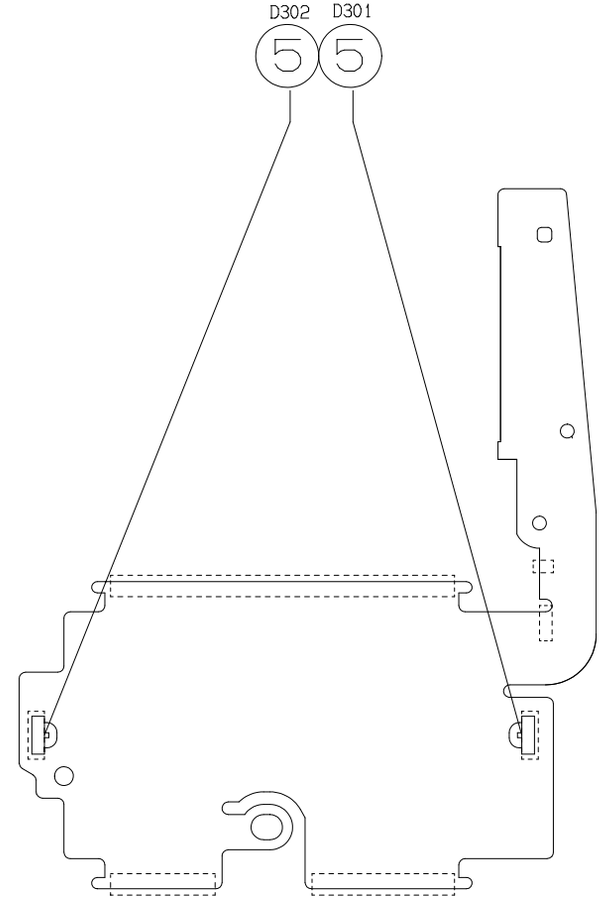


ＡＦ　ＣＣＤ　ＦＰＣ

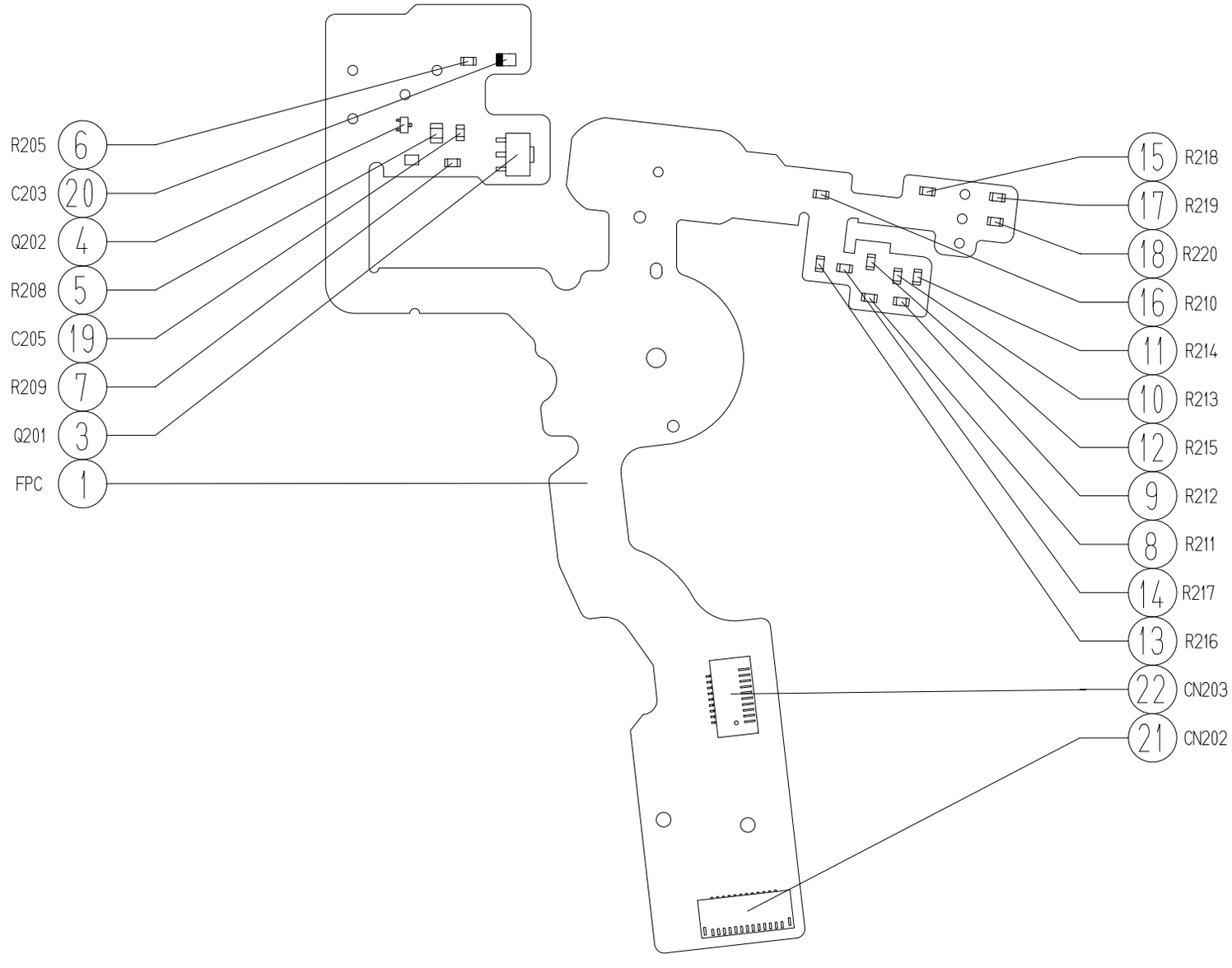


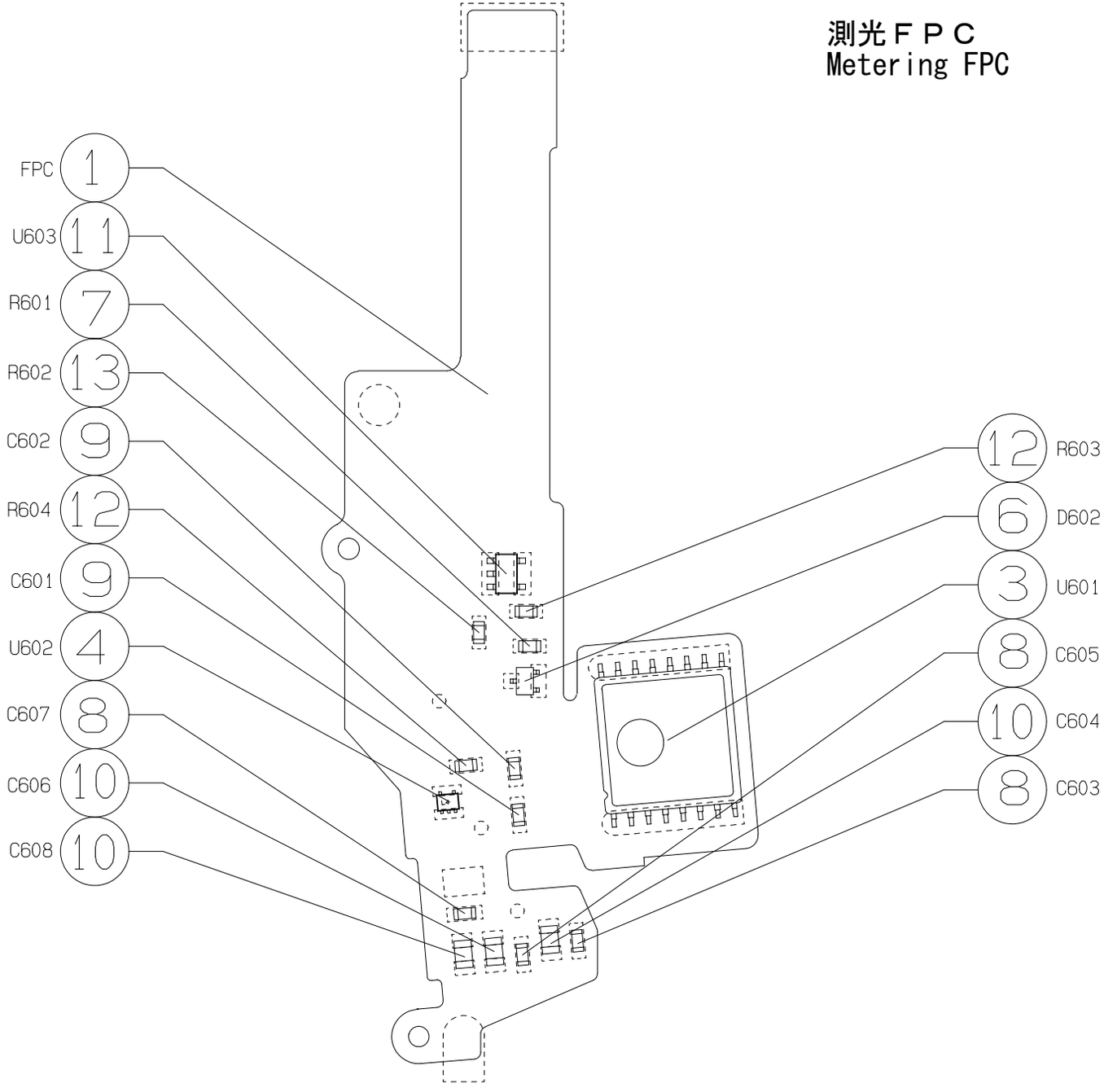
外部ＬＣＤ　ＦＰＣ
External LCD FPC



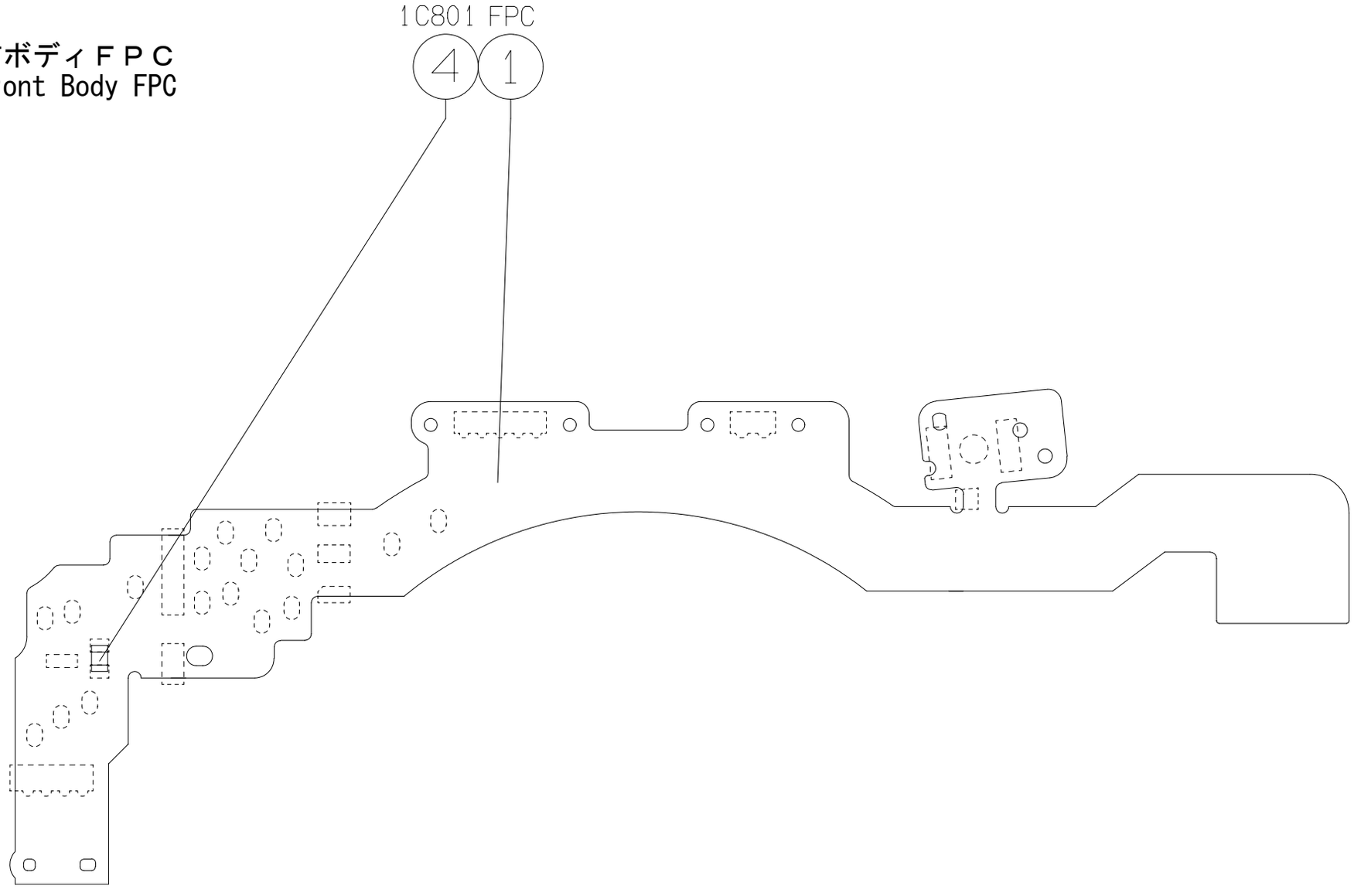


上カバーＦＰＣ
Top Cover FPC

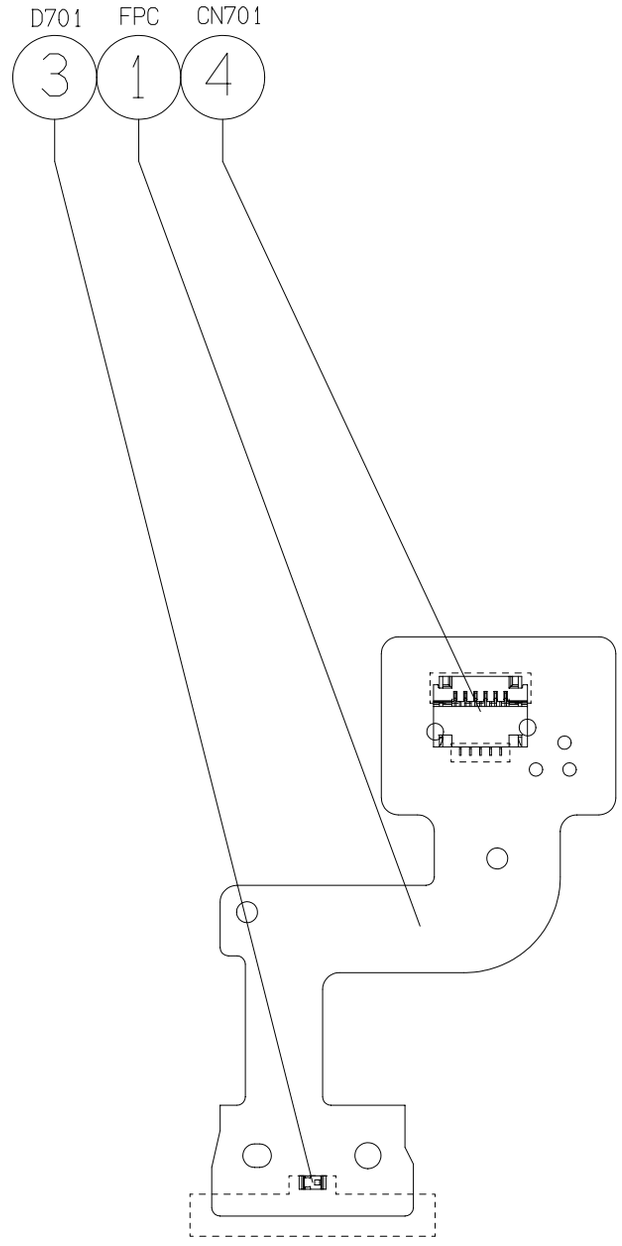



測光ＦＰＣ
Metering FPC
FPC 1
U603 11
R601 7
R602 13
C602 9
R604 12
C601 9
U602 4
C607 8
C606 10
C608 10
12 R603
6 D602
3 U601
8 C605
10 C604
8 C603

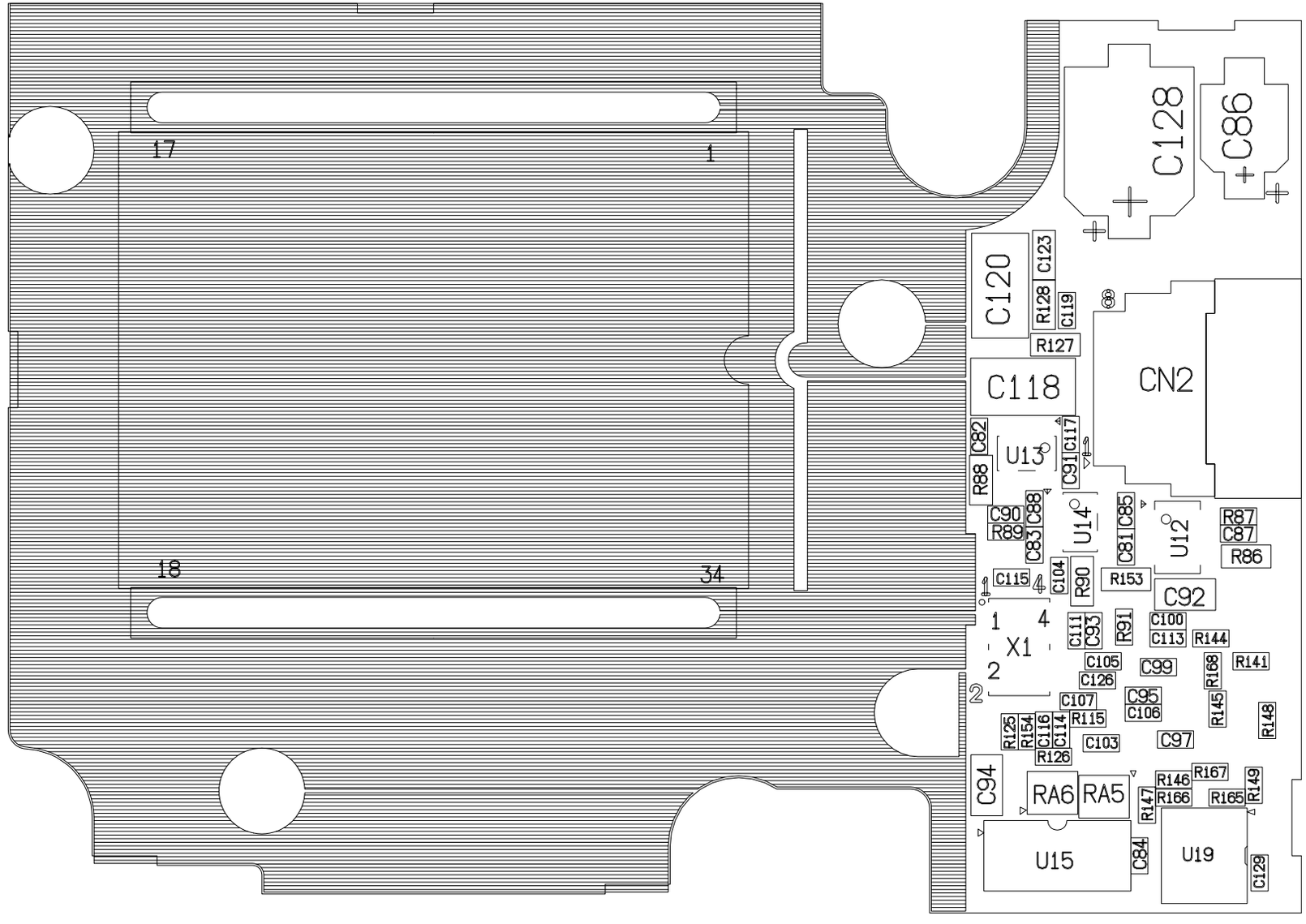
前ボディＦＰＣ
Front Body FPC



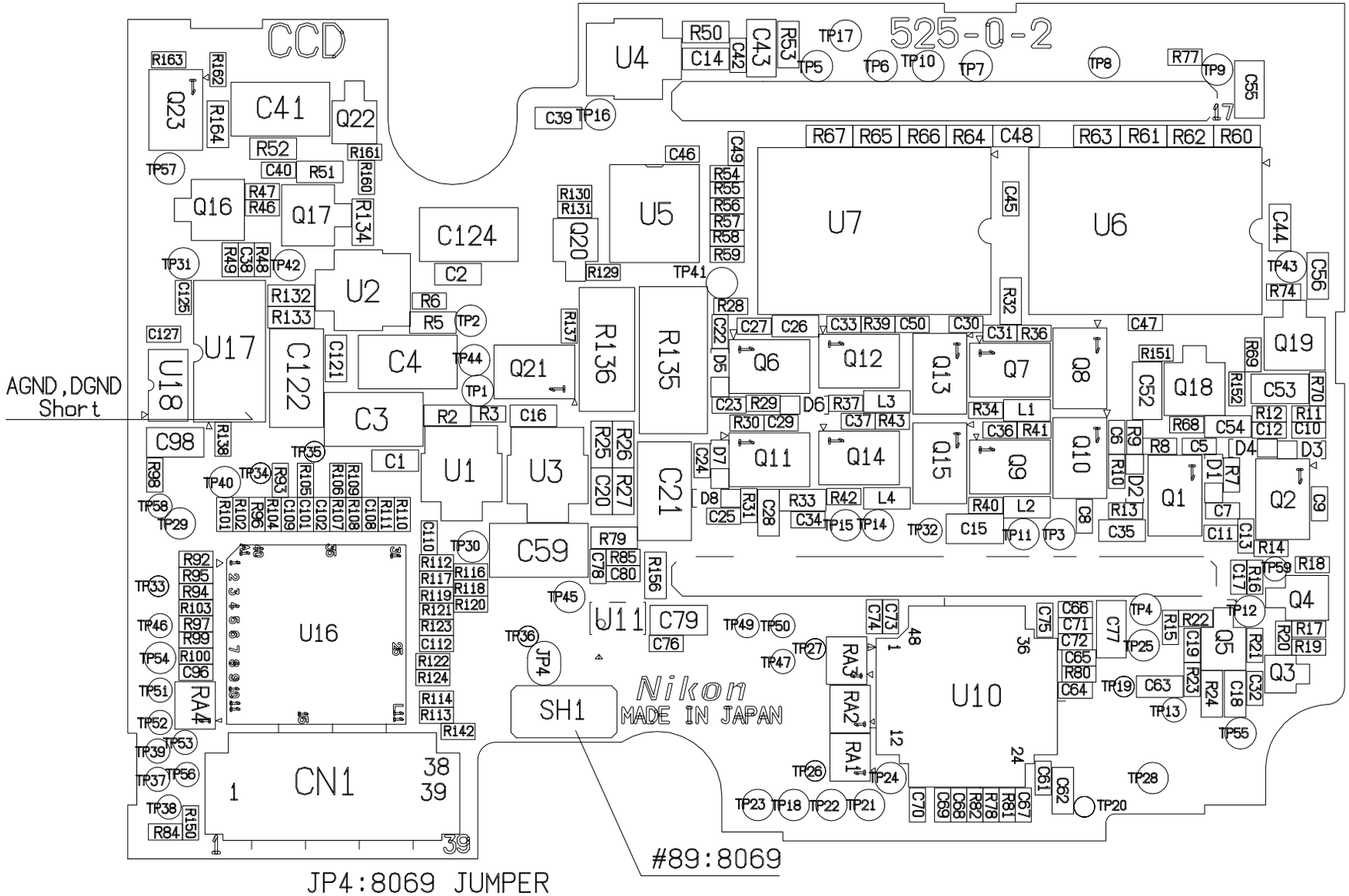
ＳＩ　ＦＰＣ



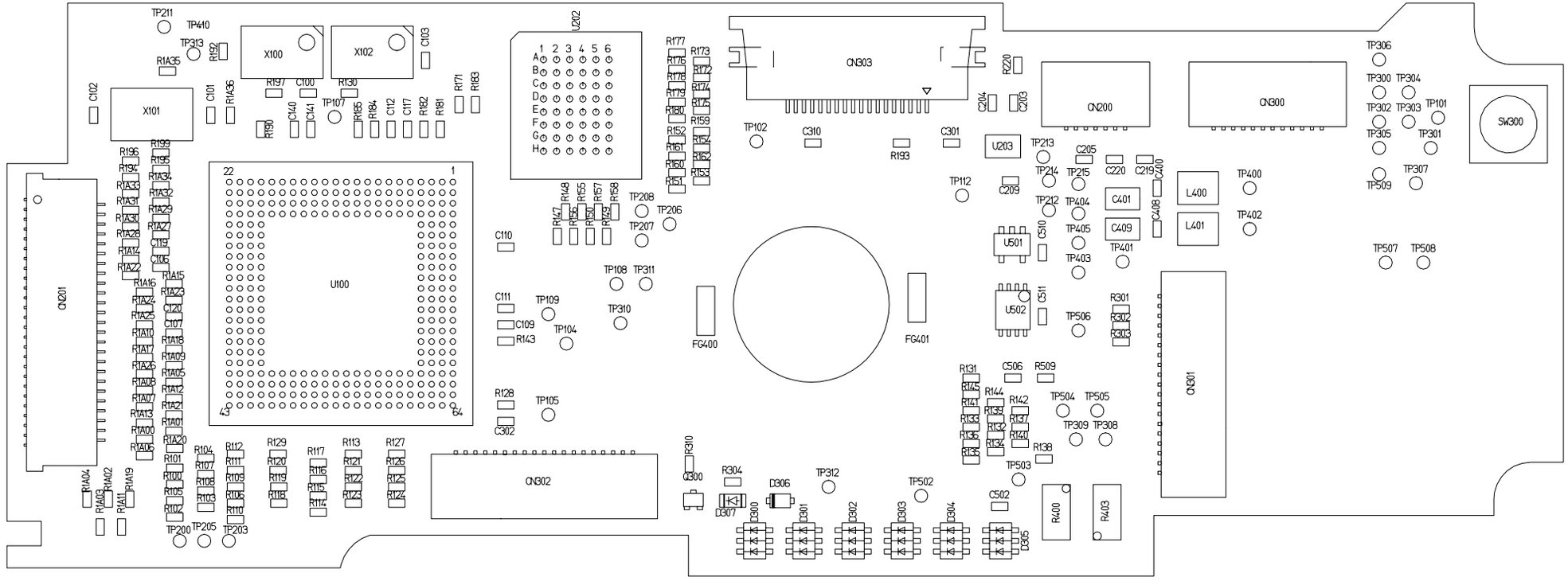
ＣＣＤ基板（表）
CCD PCB (Surface)



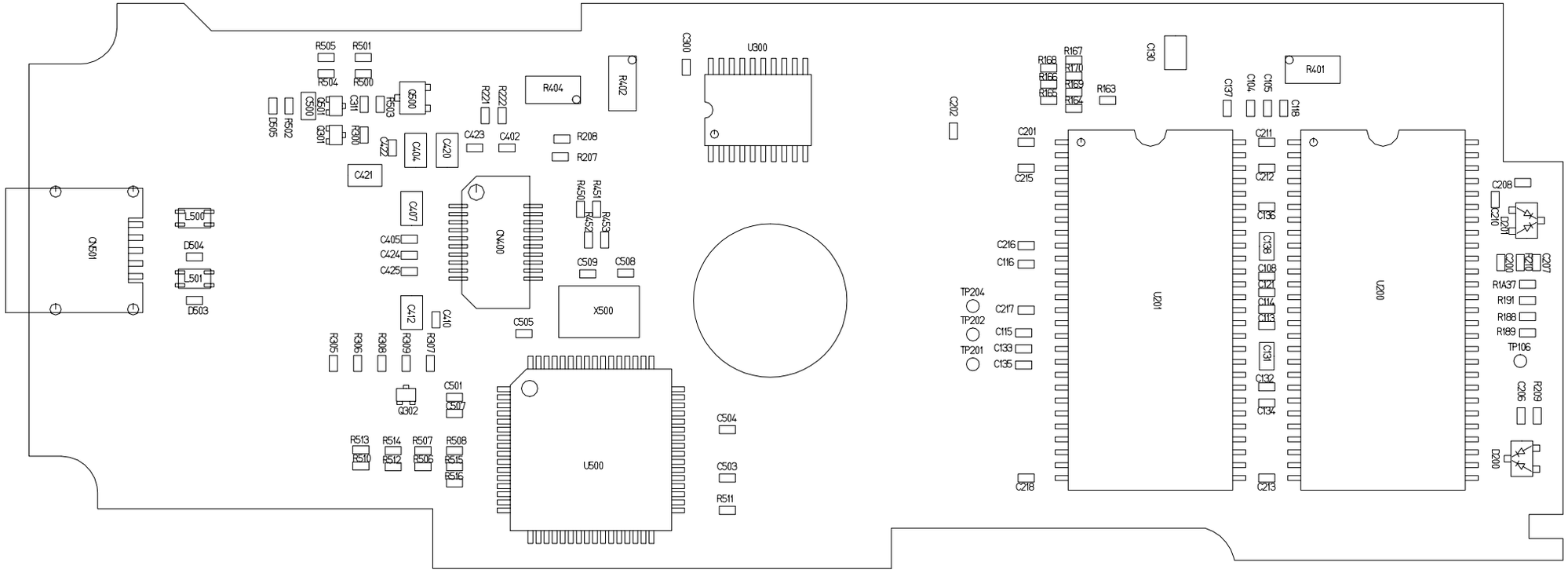
ＣＣＤ基板（裏）
CCD PCB (Reverse)



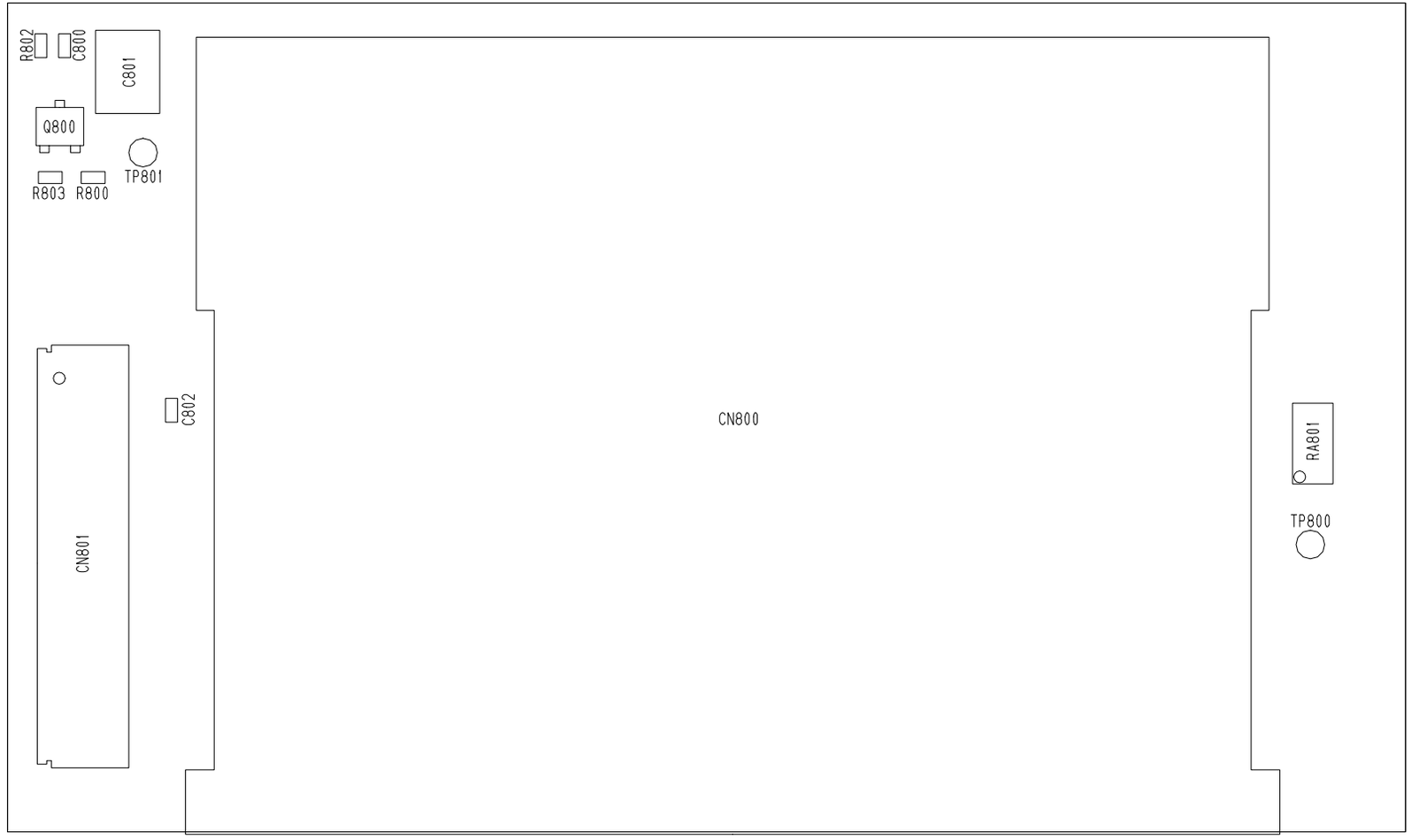
圧縮記録基板（表）
Memory Compression FPC (Surface)



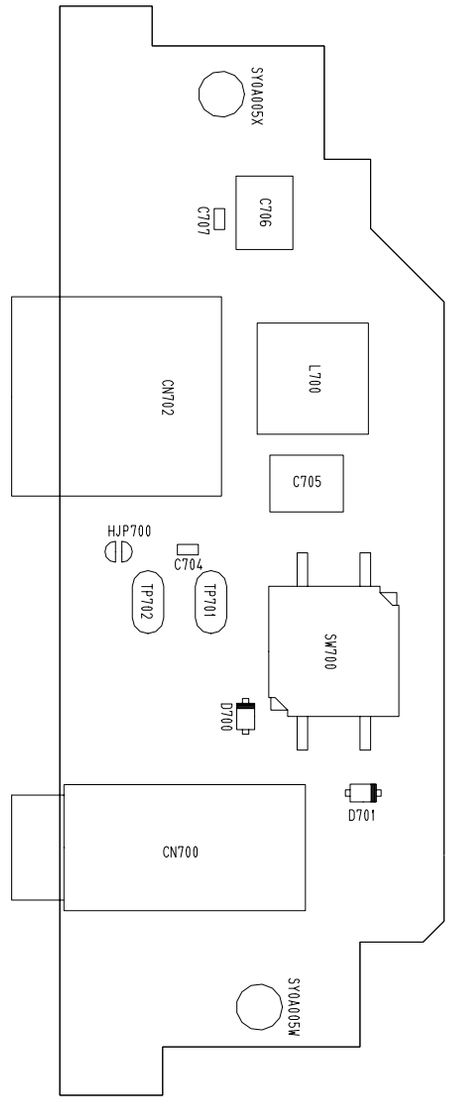
圧縮記録基板（裏）
Memory Compression FPC (reverse)

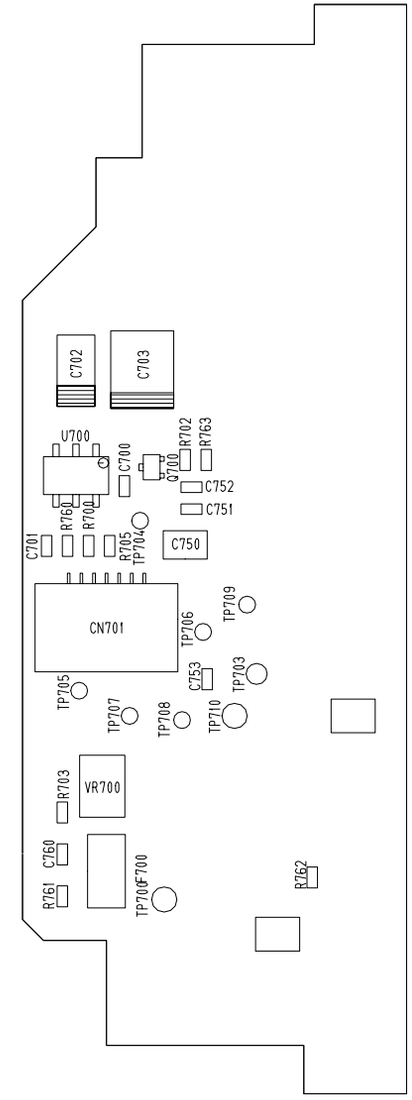


ＣＦ基板
CF PCB

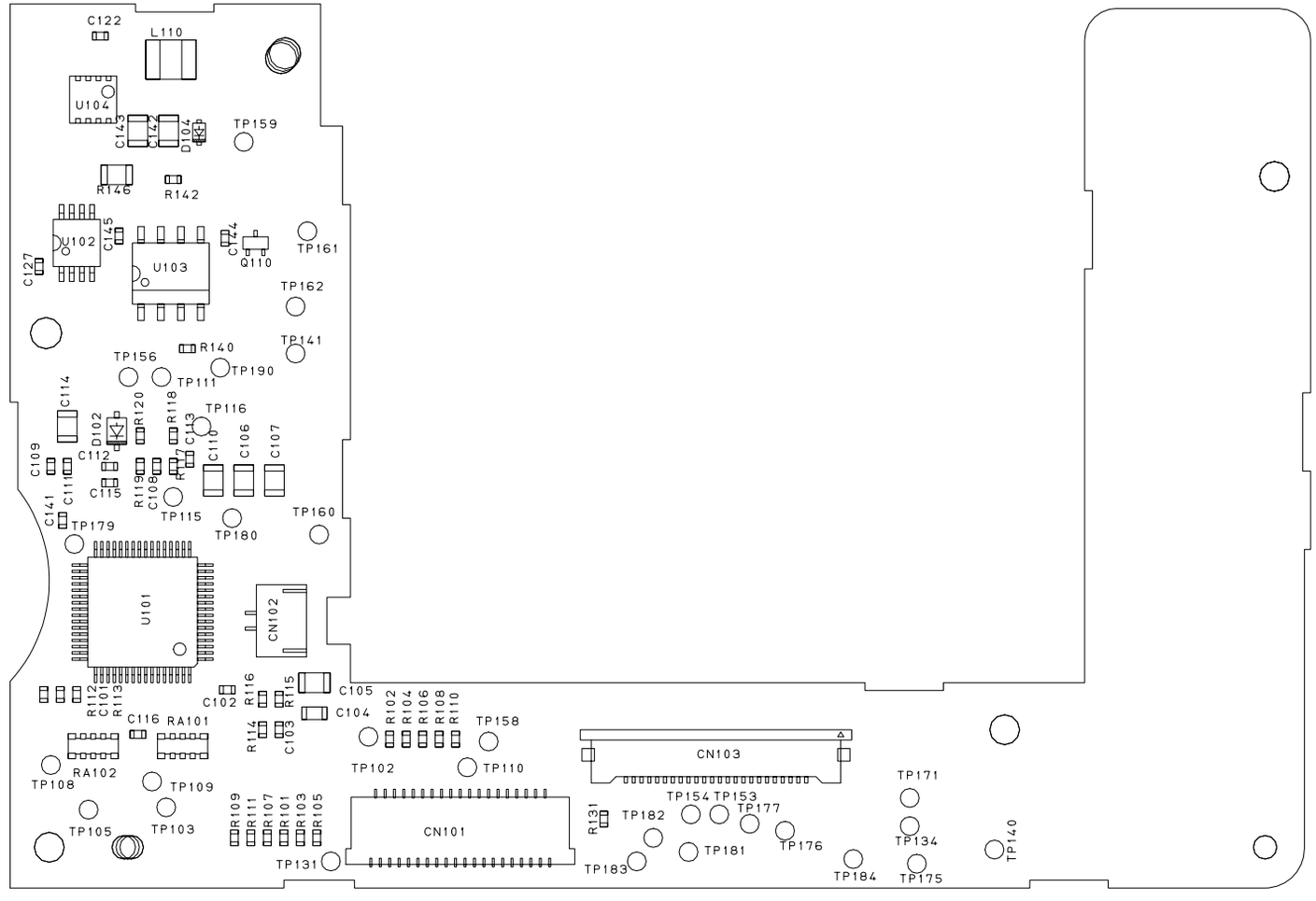

R802
C800
C801
Q800
TP801
R803
R800
CN801
C802
CN800
RA801
TP800

ＩＦ基板
IF PCB

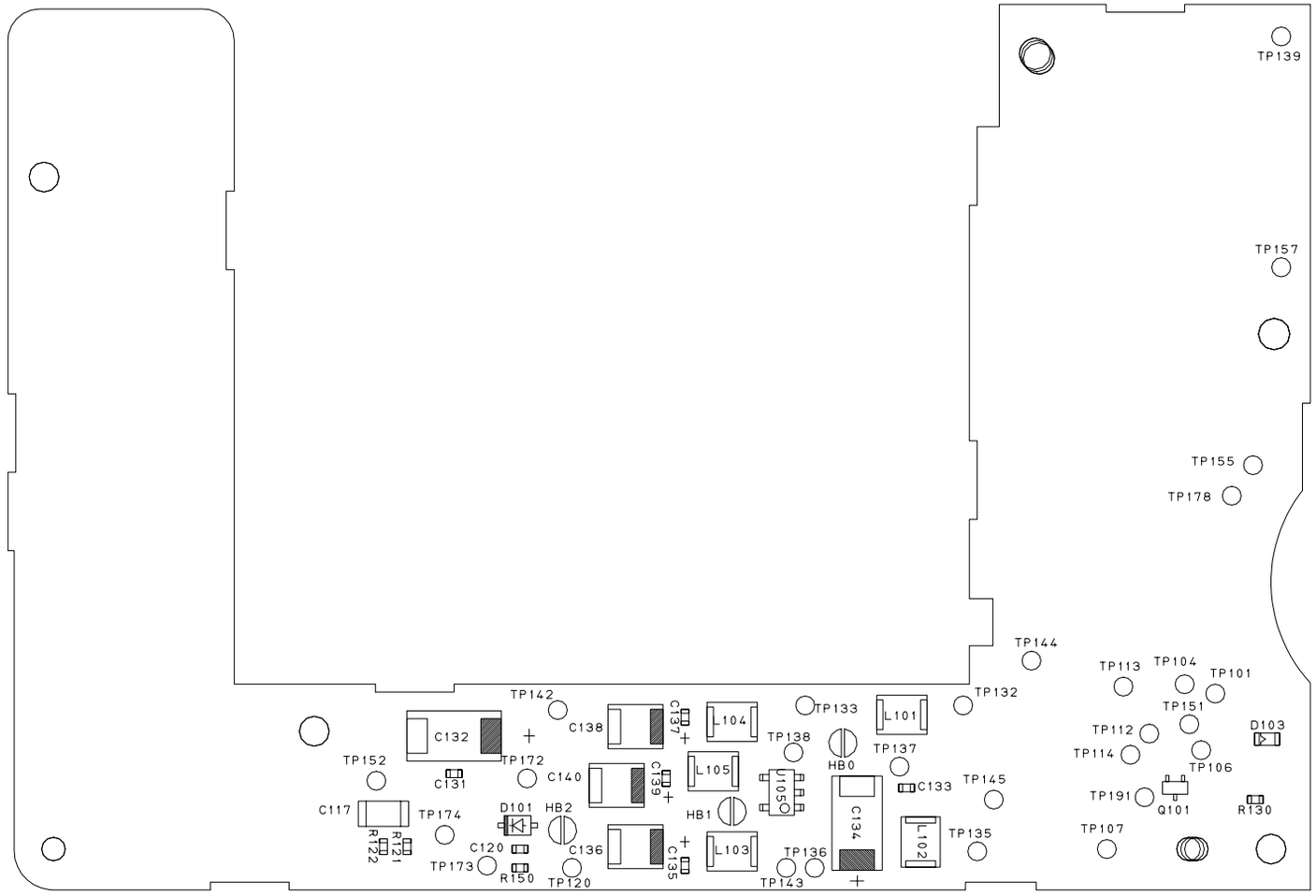

SY0A005X
C707
C706
CN702
L700
C705
HJP700
C704
TP702
TP701
SW700
D700
D701
CN700
SY0A005M


C702
C703
U700
C700
R702
R763
Q700
C752
C751
R760
R700
C701
R705
TP704
C750
CN701
TP709
TP706
C753
TP703
TP705
TP707
TP708
TP710
R703
VR700
C760
R761
TP700
R762

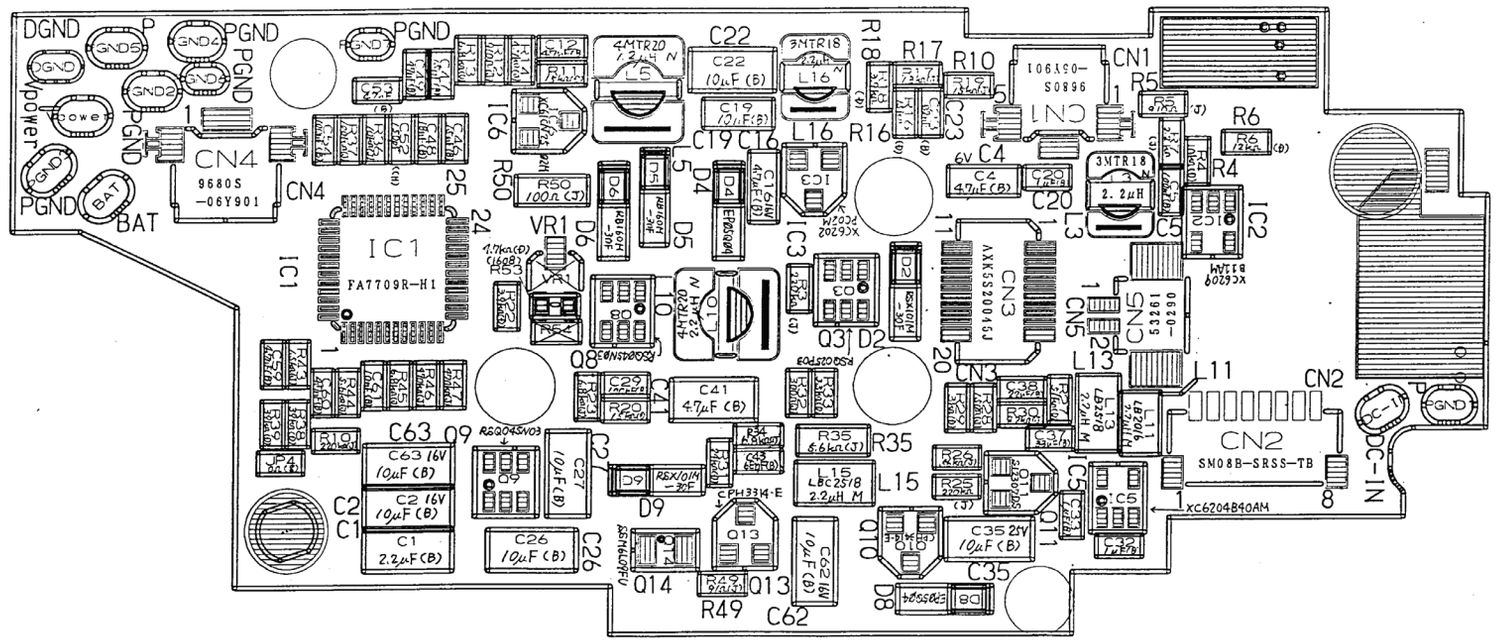
ＴＦＴ基板（表）
TFT PCB (Surface)



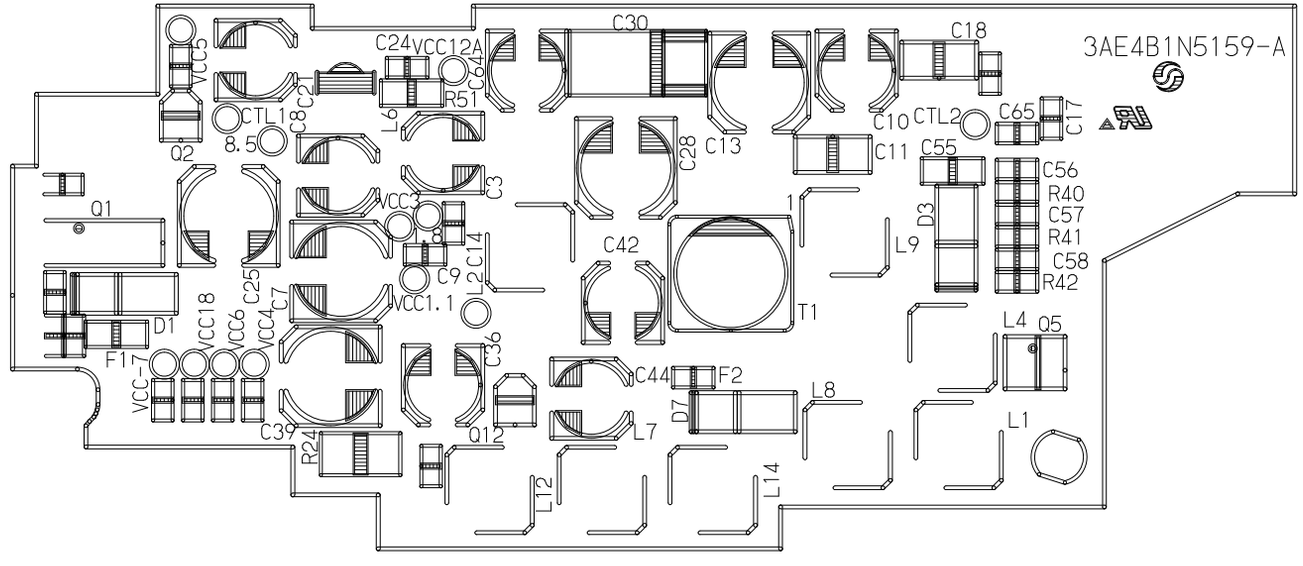
ＴＦＴ基板（裏）
TFT PCB (Reverse)



ＤＣＤＣコンバータ（表）
DC-DC Converter (Surface)

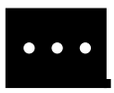
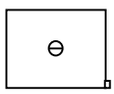
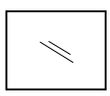


ＤＣＤＣコンバータ（裏）
DC-DC Converter (Reverse)

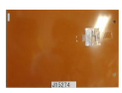


工　具・TOOLS

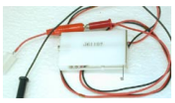
★：新規設定工具・NEW　TOOL

	工具番号 Tool No.		名　称 Name of tool	備　考 Others
	J61205		カメラ通信工具 Camera communication tool	FOR　D70
	J15411		AE CCD 位置出し工具 AE CCD positioning tool	FOR　D70
	J15410		無限合致調整用スクリーン Infinity focus adjustment screen	FOR　D70
	J18362		反射ミラー Reflection mirror	FOR　D70
★	J18383		カメラ部点検、調整ソフト Inspection and adjustment software for CAMERA	
★	J65076		撮像部点検、調整ソフト Inspection and adjustment software for IMAGING	
	J18344		ＡＦチャート AF adjusting chart	FOR　D100
	J18230		ＹＡＷ、ＰＩＴＣＨ工具 Yaw,Pitch adjustment tool	FOR　F5,F100,F90,F90X
	J15259		ＡＦ調整工具台 AF adjusting tool	
	J15280		Ｚレンズ用支持ホルダー Lens holder	
	J15264		高周波タイプ蛍光灯器具 Illumination box for AF adjustment	
	J18266		ＡＦ調整用Ｚレンズ（１ｍ用） Z adjustment lens (For 1m)	FOR　F5,F100

★：新規設定工具・NEW TOOL

工具番号 Tool No.	名　称 Name of tool	備　考 Others
J19109	ＭＣ－３１ MC-31	
J19123	シャッター試験機　ＥＦ－１（ＣＥ） Shutter Tester EF-1 (CE)	共立電機製 KYORITSU ELECTRIC ＥＦ-8000 usable
J19002	縦型焦点面検査機　LT-500S Back focus collimator LT-500S	Ｊ 19110 usable Ｊ 19110 でも代用可
J18324	サブミラー４５°出し工具 Sub mirror angle adjustment tool	FOR F5,F100,F80,F65
J18037	オプチカルパラレル Optical parallel	
J18004	絞りレバー高さ点検工具 Aperture lever positioning gauge	
J19004-1	インジケータ及びスタンド （ボディバック台、ゲージ） Dial indicator and Stand	
J18001-1	ボディバック出し工具 Body back focus gauge	
J19001	無限合致コリメーターF=600mm Collimator F=600mm	
J18010	無限大合致基準レンズ　50/1.8 Infinity Standeard Lens 50/1.8	
J18267	ＡＦ５０／１．４Ｄ Lens AF50/1.4D	
J15274 	J15264 用チャートボード Chart board for J15264	

★：新規設定工具・NEW TOOL

工具番号 Tool No.	名　称 Name of tool	備　考 Others
J61197 	電池工具 Battery tool	FOR D100
J61185	撮像関係調整用レンズ D1 Standard lens	FOR D1,D2H
J18191	ＮＤフィルター８Ｘ ND filter 8X	FOR D2H
J18358	ＮＤフィルター４Ｘ ND filter 4X	２枚使用 It uses by two pieces
J63070	カラービュワー Color Viewer	J63049 でも代用可 J63049 usable
J63068	輝度計（BM-3000） Luminance Meter BM-3000	
J63085	ﾌｨﾙﾀｰ SP1（75X75MM） Filter SP1（75X75MM）	FOR D2H
J63087	ﾌｨﾙﾀｰ SP3（75X75MM） Filter SP3（75X75MM）	FOR D2H

★：新規設定工具・NEW　TOOL

工具番号 Tool No.	名　称 Name of tool	備　考 Others
OS-30MF	ドライサーフ　ＯＳ－３０ＭＦ DRY SURF OS-30MF(OIL BARRIER)	
LEN317A	グリース　ＬＥＮ３１７Ａ Grease LEN317A	
EDB0011	ネジ゛ロック（赤）1401C Screw lock 1401C	
C-8008B	セメダイン　８００８（黒） Cemedain 8008(BLACK)	
MZ-800S	ドライサーフ　ＭＺ－８００Ｓ DRY SURF MZ-800S	
	アロンアルファ Crazy　glue	汎用品 RJ is Not available
	フラッシュメーター Flash Meter	汎用品 RJ is Not available
	デジタルマルチメータ Digital　meter	汎用品 RJ is Not available
	ＡＣアダプター　ＥＨ－５ AC adapter EH-5	製品転用 RJ is Not available
	ＵＳＢケーブル　ＵＣ－Ｅ４ USB cable　UC-E4	製品転用 RJ is Not available
	パーソナルコンピュータ Personal computer	汎用品 RJ is Not available
	安定化電源（10Ｖ　５Ａ） Power supply(10V 5A)	汎用品 RJ is Not available
	ヘクスキー（φ1.5mm） HEX.KEY WRENCH（φ1.5mm)	汎用品 RJ is Not available